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TROCUS OF AMERICA NORTH OF MEXICO

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Thesis for the degree

Master of Science.

TROGUS OF AMERICA NORTH OF MEXICO.

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Massachusetts Agricultural College,

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Introduction.

This paper on the insects of the genus Trogus (family Ichneumonidae) found in America, north of Mexico is the result of work done at the Massachusetts Agricultural College under the guidance of Dr. H. T. Fernald and forms a portion of a thesis for the degree of Master of Science. I have attempted to bring together and systematize the works previously published and have added the descriptions of four new species.

I have been unable to make a study of the life history of these very interesting insects and have found but very little data as to their hosts. I hope, however, to be able to take up this work at some future date.

There have been very few papers published on this group and these have been practically all descriptions of species. These are given under each individual species.

The genus Trogus was established by Panzer, Krit. Revis. II, p. 80, in 1806, Ichneumon coerulator Fab., being used as the type species. This is the same as Trogus lapidator var., coerulator (Fabricius). Trogus alboguttatus Gravenhorst,

designated as type by Westwood. Intr., Mod., Class. Ins., vol. 2, Gen. Syn., p. 58, 1840, was not originally included. Trogus is isogenotypic with Dinotomus Foerster.

At this point I wish to express my appreciation and gratitude to Dr. H. T. Fernald and Dr. G. C. Crampton for their untiring efforts in assisting me in the preparation of this paper. I am also indebted to Messrs. W. S. Regan, R. R. Parker and J. F. Martin for their help and suggestions. To Dr. J. Chester Bradley I wish to extend my thanks for giving the nomenclature of the parts of the wings.

External Anatomy.

Head.- The hypognathous head, when viewed from the front, is fairly large and nearly quadrangular in outline, broader above than below, and about as broad at its widest point as it is deep. The compound eyes are quite large, extending from the top of the head about three-fourths the distance to the base of the mandibles. They occupy a position almost wholly on the front of the face, extending but slightly around the sides. They are rather oval in outline and unnotched on the inner margins which are nearly straight and vertical. Except where stated to the contrary the entire head is rather sparsely coarsely punctured and clothed with short, semi-recumbent hairs.

The clypeus extend from a point between and just below the bases of the antennae downward to the labrum, its lateral

edges diverging as they proceed downward and curving rather abruptly outward as they near the lower margin which they join at the bases of the mandibles. The lower margin of the clypeus is broadly emarginate in group I but in group II it may be but slightly emarginate or even straight across. This plate is somewhat convex and shows up very prominently in group I but in the second group it is usually rather flat with its lateral edges often sunken.

The front part of the head is occupied by the frons which extends from the clypeus upward and around the antennal pits and unites with the vertex. Two arm-like projections of this plate extend downward, one on each side between th clypeus and the compound eye and fuse with the gena below the eye, there being no visible suture separating the two plates. Above the antennae is found a deep, smooth and shiny depression which extends the entire distance between the eyes. Two short ridges run through the middle of this converging and passing between the antennal pits and finally uniting at a point just above the upper extremity of the clypeus. These ridges are replaced by a single, faint suture in group II.

The ocelli are three in number forming the corners of a triangle at the top of the head; the largest one, the median ocellus, being anterior to the other two which are equal in size.

The vertex is not separated from the neighboring sclerites by any sutures and its limits are therefore indefinite. Its

anterior margin, however, may be considered as marked by the faint ridge running just in front of the median ocellus and curving slightly forward to the inner edges of the compound eyes. This paper will consider the lateral margins of the vertex as being on a line extending backward from the top of the compound eyes. The hind margin is marked by a distinct ridge near the back of the head.

The occiput is situated behind the vertex. It is deeply excavated or invaginated to allow the free movement of the head upon the neck, the articulation of which is in its center.

Extending downward from the vertex on each side, behind and below the compound eye to the base of the mandible is the gena or cheek. It is flat and receding horizontally in group I but is always more or less swollen in group II.

Fitting into the emargination of the lower edge of the clypeus is an eliptical-shaped plate, the labrum or upper lip. It is strongly exserted in group I but may be but slightly so or even invisible in group II. On its lower margin is found a row of long bristle-like hairs.

The mandibles are the strongly chitinized jaws situated just behind the labrum. They are smooth and bidentate, the lateral tooth being external to the terminal one. The maxillae are small, delicate wing-shaped structures situated beneath the mandibles. Attached to their outer extremities are the maxillary palpi. These are composed of five segments which are short and more or less stout; the second segment

with a distinct bulging lobe on its inner margin. The labrum, or under lip, is a small shield-shaped structure at the hinder part of the mouth. It is closely fused with the hypopharynx and bears the labial palpi. These are each composed of four segments which are loosely joined together and are long and slender, being more than twice as long as wide. The second segment bears the same characteristic bulge as that of the maxillary palpus.

The antennae are long and slender and seldom if ever, carried in a curled position, though usually curved somewhat towards their tips. They are clothed with a thick covering of sericeous pile. The bulb of the scape is quite small and rounded and is inserted in the circular socket or antennal pit. Viewed from the front, its union with the outer part of the scape is marked by a constriction above which the latter swell abruptly and assumes a somewhat barrel-like form, being truncate at either end. It is deeply invaginated behind and in this cut is situated a third portion of the scape, which is much narrower and extends outward protected by the anterior portion. Articulating with this third portion is the pedicellus, an extremely narrow ring, connecting it with the flagellum or filament of the antenna.

In group I the filament is made up of about thirty-two segments in the males and thirty-four in the females, the number varying; but in group II the number of segments is

much greater and they are rather short, being no longer than broad and often broader than long.

Male Antenna.- The segments of the male antenna are serrate, the serration varying in degree with the species and to a slight extent with the individual. They are covered with numerous small oval areas which appear to be sunken below the surface. The number of these sense organs, for such they must be, varies. In group I we find two areas on the serrated side of the segments, one above and one below the apex of the serration, composed of a cluster of fine punctures, extremely close together and giving the appearance of an area of fine pin pricks. These areas are not present on the segments in group II, but we do find from 16 to 22 oval patches placed lengthwise on the under side of the middle segments, those in the center being quite large but decreasing in size towards the two ends.and finally becoming obsolete. These organs bear a few short, fine hairs which seem to be set in tiny pits and can be detected only after treating with caustic potash and mounting in balsam. There is also a row of bristle-like hairs running transversely across the under side of each segment. The bristles are localized on the point of the serrated side in group I.

Female Antenna.- Ashmead's table of generic classification gives as an antennal character of the females the following:

"Antennae in ♀ at or beyond the middle widened, compressed."

This character is decidedly variable and cannot safely

be made use of in the classification of these insects. The antennae are filiform and often cylindrical throughout, gradually tapering from the outer third to the tip. The only sense organs visible are the numerous small oval sunken areas already described in the males.

Prothorax.- The prothorax is quite small and cylindrical at its anterior end where it articulates with the head, but enlarges abruptly to form the portion which I have called the shoulder. This portion of the pronotum is a nearly vertical plate; its median portion facing almost squarely forward, while its side above extending back along the sides of the thorax as a narrow prolongation below the tegula nearly to the base of the wing. Its hinder margin extends downward and forward from this point curving slightly backward near its lower extremity to the base of the fore coxa, where it makes an acute angle and runs forward and slightly upward to the central part of the head articulation.

The neck and shoulder are separated by a more or less pronounced ridge, the pronotal ridge, which extends from the hind margin, near the coxal cavity, forward and upward to near the median line, at which point it turns upward making almost a right angle, crosses the polished gutter-like groove lying behind it and becomes obsolete. This ridge is quite prominent in some species and is also found in allied genera.

The neck is narrow and constricted, enlarging slightly

at its anterior end where it joins the head region. The shoulder is quite broad and bears, near the base of the tegula, a small circular to oval spiracle. Its lower half is deeply concave, smooth and shining in group I but in group II it is but slightly concave and is either rugose or coarsely punctured.

The posterior margin of the pronotum is in the form of a large reentrant angle occupied by the front of the mesoscutum, the front end of which contributes to the vertical front face of the thorax.

Below the pronotum is found the propleuron joining the base of the fore coxa and extending forward and articulating with the head. Running parallel and close to the upper margin of this plate is a faint ridge, the upper face of which is very closely finely punctured while the under face is very coarsely punctured; both being pubescent although the hairs appear to be much longer and thicker on the latter.

These facts might suggest the presence of a suture along this ridge separating the plate into episternum and epimeron, but this cannot be determined from the adult.

Mesothorax.- The mesonotum (morphologically the scutum) is a large dorsal plate extending from the posterior margin of the pronotum backward above and behind the tegula to the scutellum, its hinder margin being hidden by the flap-like parascutellum. It broadens going backward to about the middle of the tegulae, then narrows rather sharply and its posterior margin is transverse giving it, when viewed from

above, a somewhat hexagonal outline. It is usually closely covered with fine punctures and thick, short, somewhat decumbent hairs.

Behind this plate rises the scutellum on the dorsal surface of the mesothorax. In group one it is decidedly conical in shape, its summit rising to a distinct point, but in group two it is more rounded above and may bear faint lateral ridges, its highest point being but slightly, if any higher than the mesonotum. Its summit and hind margin are smooth and shiny in group one but are sparsely, coarsely punctured and heavily clothed with rather long hairs in group two. Extending forward and downward toward the base of the forewing from the side of the scutellum is a small flap-like extension, the parascutellum, which overlaps the posterior angle of the mesonotum.

The mesopleuron occupies that portion of the mesothorax below the wings. It is made up of the prepectus, the episternum and epimeron.

The prepectus the homologue of The sclerite termed "hypopteron" by Audouin (1820), occupies a position at the anterior part of the mesopleuron. Its hinder margin, a faint ridge, starts at the base of the plate and runs upward, curving slightly forward until it nearly unites with the anterior margin, then curving strongly backward and ending at the base of the membranous portion behind the forewing. Its upper portion is occupied by the mesothoracic lobe, an elevation below the tegula and produced backward into a narrow ridge

which becomes obsolete on the dorsal edge of the mesopleuron nearly opposite the posterior lateral angle of the parascutellum.

The <u>episternum</u> occupies the central portion of the mesopleuron. It is strongly depressed near its upper hind margin and also at a point slightly posterior to the center. At these two points are found but very few scattered coarse punctures which are set more closely on the rest of the plate. In group one the entire upper hind quarter of the plate is almost entirely smooth and shiny. In group two the lower portion of the episternum is often rugose. A pronounced smooth groove with numerous parallel cross ridges extends down the hind margin of this plate, separating it from the narrow epimeron which lies behind. Running parallel to this groove and often so close to it as to be almost imperceptible, is the epimeron. This plate at its upper end forms a rather large somewhat triangular area, the upper anterior margin of which rests against the posterior margin of the postscutellum and below this the base of the hind wing.

The sterno-pleural suture is not clearly defined so the limits of the mesosternum cannot be determined. However, this plate lies directly below the mesopleuron on the ventral surface and extends between the pro and meso coxal cavities. There is a longitudinal line running through the middle of this plate. It is always clothed with long hairs and its rather fine punctures are set moderately close together.

Metathorax.- The postscutellum (metanotum, morphologically speaking) lies directly behind the scutellum and is raised and rounded in the middle, which portion varies with the species from smooth and highly polished to closely finely punctured and hairy. Laterally, it is deeply excavated in a broad groove which bears a few scattered punctures and more or less pronounced transverse ridges. Near the lateral margin of this plate, just above the base of the hind wing, is found a small flap-like sense organ varying in size and distinctness in different species and covered with coarse sensory hairs. This organ is often greatly reduced in group two although a trace of it may always be found.

Directly behind the postscutellum, just described, lies the true metathoracic postscutellum, very narrow when viewed from above and apparently without any name in systematic entomology. It extends laterally and forward below the base of the hind wing to the posterior margin of the meso-epimeron. Below, it is directly continous with the metapleuron, no trace of a suture between the two plates being perceptible. This plate (metapostscutellum) is always smooth and shiny and deeply concave.

A short distance below and behind the base of the hind wing arises the metathoracic lobe, much similar in structure to the mesothoracic lobe previously described, but its ridge-like extension runs backward and then downward to the base of the hind coxa separating the metapleuron from the propodeum

or median segment above. It is clothed with long hairs and is sparsely finely punctured. Along the lower edge of this lobe and curving down along the anterior margin of the metapleuron to the base of the meso-coxa runs a deep gutter-like structure crossed by many parallel ridges which convert the groove into a row of small pockets. This is polished and forms a very distinct anterior margin for the sparsely coarsely punctured and often rugose metapleuron. In group one we find a very sharp median ridge running through this plate but in group two it is either very faint or entirely wanting.

The metasternum lies ventrally between the meso and metacoxal cavities and is separated from the metapleuron by a distinct ridge extending from near the base of the meso-coxa to the meta-coxal cavity. It is clothed with long hairs.

The propodeum or median segment rises abruptly behind the metathoracic scutellum to a point as high as or higher than the postscutellum. At the front of this upper surface is a small apical area which is sometimes smooth and shiny and sometimes concave and punctured. (This area appears to be absent in a few species.) Ridges extend from this backward and down each side separating the plate into three distinct areas, the median, termed the areola and two lateral areas or fields.

The lateral field does not extend to the lateral margin of the propodeum, being limited by a lateral ridge, somewhat above that margin, which begins as a transverse ridge starting from the hinder edge of the apical area and then either

bending backward to form the lateral ridge and extending to the posterior edge of the plate or joining a longitudinal ridge which extends farther forward above the spiracle. In this case the last named ridge becomes obsolete in a maze of sculpturing before reaching the end of the propodeum. The propodeum is therefore divided into five fields behind the apical area, namely:- the median field or areola, two lateral fields and two marginal fields. Lying in a well-defined stigmatal area is the propodial spiracle. This is oval in group one and linear in group two.

The propodeum is clothed with long hairs, recumbent or semi-recumbent at the sides but erect on the median area, and is sparsely covered with coarse punctures.

The propodeum or first abdominal segment just described, has become so closely fused with the thorax and so separated from the remainder of the abdomen by the constriction formed by the narrow front end of the second or petiolar segment of the abdomen, that as a matter of convenience in the descriptions in this paper it will not be counted as a part of the abdomen, the petiolar segment being counted as abdominal segment number one. That this is not morphologically correct, however, should be clearly understood.

Abdomen.- The first segment or petiole of the abdomen is quite narrow laterally at its base but widens abruptly at its posterior half to nearly the width of the following segments. The abdomen is always raised, the petiole curving backward and upward to about the same level as the top of the

propodeum, the remainder of the abdomen being generally carried in a more or less curled position, its terminal segments being frequently anterior to some of those preceding it. The dorsal surface of the petiole, especially that of the post petiole, is variable and the character of this segment aids greatly in the determination of species. It may be flat, bicarinate or raised to a point.

In group one, the evident segments following the petiole six in the males and six in the females (the last one greatly reduced in size) are flattened above and strongly constricted at the base, allowing a slight overlaping of the segments. The second segment bears deep pits or gastrocoeli near the upper anterior corners. These, though present, become greatly reduced in the following segments.

In group two, the evident segments following the petiole, six in each sex, are normally exserted, not constricted at the bases and gastrocoeli are wanting.

The abdominal spiracles are small, oval or circular, sometimes linear, and situated laterally near the bases of the segments.

The dorsal and lateral surfaces are clothed with long, fine hairs and may be sparsely coarsely punctured, sometimes aciculate, as is the general rule in group one, or closely finely punctured and clothed with very short fine hairs as is usually found in group two.

The ventral surface is usually flat but in some species segments two and three, sometimes four, bear a median ridge.

It is very sparsely clothed with short hairs and bears scattered fine punctures.

The genitalia are found between the last ventral and dorsal segments which are quite blunt. The male genital apparatus is often strongly exserted so that its structure is plainly discernible. The piercing organ of the female is sometimes exserted but as a rule the genitalia are not visible. At the base of the last dorsal segment of the males are found the two genital palpi which are very small and clothed with fine hairs.

Owing to the limited material at hand, a detailed study of the genitalia has not been made. Fortunately they do not appear to be essential to the determination of species.

Tegula.- The tegula is a small convex plate lying over the base of the forewing, separating it from the pro- and mesonotum. Its upper edge is somewhat rounded or arched and extends forward to a point just above the pronotal spiracle. Its posterior angle is smooth and shiny but the rest of the plate is sparsely coarsely punctured in group one and sparsely, finely punctured in group two. It is always clothed with fine recumbent hairs.

Wings.- The wings range from light yellow to blackish fuliginous, often with dark smoky clouds or bands and the veins are usually much darker than the membrane. Aside from the variable degree of development of the accessory spur and a more or less pronounced trace of a vein starting from the middle of M 1 + 2 and M 3+4, the venation is constant

throughout and offers no characters for the determination of species. Therefore, I believe that the Needham- Comstock system and that used by Cresson in his Synopsis of American Hymenoptera as shown on the plates, will be sufficient for all purposes.

Legs.- The legs are long and slender, usually sparsely, coarsely punctured and thickly clothed with rather long semi-recumbent hairs. The tibiae appear to be the only segments which are armed with spines or bristles. Two rather long spines, clothed with short recumbent hairs, are found at the tips of the mid and hind tibiae, a single modified spine being present at the tip of the fore tibia. In group two the tibiae also bear short, scattered, bristle-like spines, ~~these~~ which are wanting in the species of group one.

The fore coxa articulates with the prothorax at the base of the latter and is rather bulbous in shape. The trochanter is short, being but twice as long as broad. The femur and tibia are long and slender, both being of about the same height and shape, the femur a little stouter. At the tip of the tibia is a single long, slightly curved spine, clothed with hairs and bearing on its inner surface a row of short, stiff, close-set bristles. This spine together with a notch or cut at the base of the first tarsal segment, also provided with a row of fine bristles, forms the apparatus known as the antenna cleaner.

There are five tarsal segments; the first being much

longer than the second, the third shorter than the second, the fourth the shortest and the last about the length of the third. At the tip of the last segment are the strong streating claws, between which is a well developed pulvillus. Each of the other segments is densely covered with hair below and bears a spine on each side at it's outer end.

The mid and hind legs are but slightly different from the front legs except that they are much stouter and longer and in place of the antenna cleaner at the tip of the tibia is found the pair of spines already referred to. The trochanter of the hind leg is made up of two distinct parts, there being a deep suture extending diagonally through the middle to the base.

Trogus Panzer.

1. Head narrowed beneath, cheeks flat, abdominal segments strongly constricted at base.....2

   Head not narrowed beneath, cheeks more or less buccate, abdominal segments not strongly constricted at the base.....9

2. Body entirely fulvo-ferruginous....8 exsertus Br.(p.)

   Body not entirely fulvo-ferruginous.....3

3. Body entirely black.....4

   Body black, and ferruginous, fulvous or yellow.....5

4. Labrum, tibiae and tarsi yellow.....1 fulvipes Cress.(p.)

   Labrum hidden, abdomen with a violaceous luster.....= 2 apicatus Davis (p.)

5. Wings banded with black or fuliginous.....8

   Wings uniformly fuliginous.....6

6. Abdomen brownish, scutellum, tegulae and legs including coxae ferruginous.....3 fletcheri Harrington (p.)

Abdomen fulvous with black markings, petiole becarinate...7

7. Petiole and base of following segment black.....
4 flavipennis Cress.(p.)

Abdominal segments two to five with black spot on disc...
7 edwardsii Cress. (p.)

8. Apical one-fourth of anterior wings and a band across before stigma, and apical two-thirds of hind wings black.....5 pulcherrimus Ashmead (b.)

Wings yellow with tips and transverse bands of fuliginous .....6 fasciipennis Cress.(p.)

9. Body and wings black; antennae dull grey.....
9 atrocaeruleus Cress. (p.)

Body black vinaculate.....10

Body at least partially ferruginous or fulvous.....12

10. Wings yellow with smoky apical margins; antennae black..
12 marginipennis Cress. (p.)

Wings dark fuliginous, antennae orange yellow.....11

11. Postpetiole elevated and sub-pyramidal before apex.....
10 brullei Cress. (p.)

Postpetiole not elevated, becarinate before apex.....
11 obsidianator Br. (p.)

12. Body black, and ferruginous or fulvous.....13

Body entirely ferruginous or fulvous.....19

13. Abdomen entirely black.....
13 Austrinus Cress. (p.)

Abdomen not entirely black.....14

14. Petiole entirely black.....15

Petiole at least partially fulvous or ferruginous.....16

15. Second abdominal segment with broad fulvous band.....
14 atrox Cress. (p.)

Third and following abdominal segments ferruginous.....
15 apicalis Cress (p.)

16. Basal segments more or less fuliginous. 17

Base of petiole black, apical portion fulvous or ferruginous..20

17. Wings entirely fuliginous.....17

Wings yellow, apical margins fuliginous.....19

18. Thorax black beneath.....~~16~~
16 occidentalis Cress. (p.)
Thorax entirely fulvous.....~~17~~
17 nubilipennis Hall. (p.)

19. Antennae yellow, black at tips.....~~18~~
18 vescicensis Prov. (p.)
Antennae black, scape yellow beneath.....~~19~~
19 belfragei Cress. (p.)

20. Antennae at least partly black.....21

Antennae orange or brown.....22

21. Abdominal segments one to four with basal black bands.....~~20~~
20 nigrocinctus n. sp. (p.)
Antennae with pale yellow annulus.....~~23~~
23 annulatus n. sp. (p.)
Antennae entirely black.....23

22. Antennae reddish brown; wings blackish fuliginous.....~~24~~
24 fusicornis n. sp. (p.)
Antennae orange yellow, tips dusky.....~~25~~
25 Cressoni n. sp. (p.)

23. Posterior legs entirely black.....~~21~~
21 cockerelli Cress. (p.)
Posterior tibiae and tarsi fulvo-ferruginous.....~~22~~
22 canadensis Prov. (p.)

24. Wings yellow with fuliginous markings.....25

Wings dark fuscous.....26

25. Apical margins of wings smoky.....~~28~~
28 mellosus Cress. (p.)
Wings with a large spot at tip and a triangular mark at center, violaceous black.....~~29~~
29 elegans Cress. (p.)

26. Postpetiole elevated and subpyramidal before apex.....~~26~~
26 rileyi Cress. (p.)
Postpetiole not elevated, rather depressed.....~~27~~
27 buccatus Cress. (p.)

Trogus fulvipes Cresson.

Trogus fulvipes Cres., Trans. Am. Ent. Soc., II, 95, 1868.♂

Trogus obsidianator Prov., Nat. Can., VI, 335, 1873,♂ (nec. Brulle

Trogus fulvipes Cres., Trans. Am. Ent. Soc.,VI, 195, 1877, ♂

Trogus fulvipes Prov., Nat. Can. XI, 15, 1879. ♂.

Trogus fulvipes Prov., Faun. Ent. du Ca[illegible]., Hym., 302, 1885. ♂

Type: One male specimen from Maine, now in the collection of the Am. Ent. Soc. at Philadelphia (type No. 1875.)

Rather small, entirely dull black except the labrum, upper portion of the mandibles, knees, tibiae and tarsi, which are orange yellow. Antennae black, but lighter beneath. Wings fuliginous with an aeneous reflection.

Head.- Head rather quadrangular in outline: clypeus strongly convex with a faint depression across its center, its lower edge slightly emarginate and its upper portion truncate: it is sparsely coarsely punctured and clothed with few short black hairs. Upper part of frons sunken or hollowed out, smooth and shiny and with a distinct frontal suture through its middle from between the antennae to the median ocellus: the downward projections of the frons sparsely, rather coarsely punctured and clothed with short, black hairs. Across the top of the head, on the vertex and extending around the ocelli, is a band of very fine punctures behind which are more coarse punctures sparsely placed. Cheeks very flat, receding, the punctures coarse and widely separated. Both vertex and cheeks are clothed with short, black, semi-recumbent hairs. The

labrum is very strongly exserted, bright orange, clothed with many long yellowish hairs which extend down over the mouth, it is sparsely coarsely punctured. Mandibles black with orange inner margin, smooth and shiny at the tips, sparsely punctured near the base. Antennae black above, lighter beneath, and strongly serrate in the males. Patch-like sensory organs wanting.

Thorax.- Pronotal ridge very faint or even indistinct but the groove quite pronounced and bearing a few scattered fine punctures. Pronotum rather closely coarsely punctured and clothed with semi-decumbent, black hairs. Propleuron divided into two distinct areas by a longitudinal ridge.

Mesonotum clothed with thick, short, semi-recumbent, black hairs and coarsely punctured. Mesothoracic lobe rather finely punctured as compared with the thick, coarse punctures on the lower half of the mesopleuron: except for a few scattered coarse punctures along the anterior margin, the central portion of the mesopleuron is smooth and shiny from front to rear: pleural depressions quite deep and distinct.

Metathorax very sparsely covered with large punctures and short, black, slightly recumbent hairs: pleural ridge very distinct and terminates in a prominent pointed protuberance at the base of the hind coxa.

Median and lateral areas of the propodeum quite closely sculptured and bearing a few short, black hairs, the apex rather rounded with a single narrow, transverse ridge; spiracle

oval somewhat fulvous.

Abdomen.- Abdominal segments deep black, truncate and strongly constricted at their bases. Gastrocoeli very prominent on the sides of the second segment, less prominent on those following: dorsal surface aciculate and bears short, almost decumbent black hairs: ventral surface smooth but bearing a few short black hairs. Petiole bicarinate, the carinnae becoming obsolete before reaching the hind margin. Abdominal spiracles oval, very slightly raised.

Wings.- Wings fuliginous with an aeneous reflection. The accessory spur on vein Mg is quite strongly developed in this species.

Legs.- Knees, tibiae and tarsi orange yellow, covered with short orange colored hairs and scattered fine punctures; remaining parts black with brownish black hairs and sparse fine punctures, except the coxae which are more closely and coarsely punctured.

Habitat: Me., N. H.

The above description has been prepared partly from the type, partly from one other specimen found in the collection of the Am. Mus. Nat. Hist. in New York. This is apparently a rather rare species. No dates of capture are given on the specimens seen.

Cresson states (Trans. Am. Ent. Soc., VI, 195, 1877) that obsidianator Prov. (nec. Brullé) is a synonym. I have not seen Provancher's specimens.

Trogus alicatus Davis.

Trogus alicatus Davis, Trans. Am. Ent. Soc. XXIV, 352, 1898, ♀.

Type: One ♂ in the ~~Mus. Univ. of Nat. Hist. of~~ Collection of the Am. Ent. Soc. at Philadelphia (No. 178).

Small, entirely black, abdomen with a slight bluish lustre; tibiae and tarsi and four anterior femora pale fulvous.

Head.- Small, greatly narrowed below when viewed from the front. Clypeus narrow, almost flat, the lateral edges concave, lower margin broadly emarginate: upper portion quite closely coarsely punctate, more sparsely punctured below. Upper portion of frons quite deeply excavated, smooth and shiny. Vertex and cheeks sparsely coarsely punctured and clothed with short semi-decumbent black hairs. Cheeks narrow strongly flattened and receding. Labrum hidden or but very slightly exserted. Mandibles dusky, fulvous or brownish, polished at tips. Antennae black, long, slender, and of the type found in group one.

Thorax.- Upper portion of pronotum sparsely coarsely punctured and clothed with semi-decumbent black hairs: lower portion smooth and shiny and quite deeply concave behind the fairly prominent pronotal ridge. Propleuron small, appearing as a single plate, the pleural ridge being indistinct or wanting: clothed with fairly long semi-decumbent black hairs and sparsely rather finely punctured. Mesonotum rather short, closely coarsely punctured and clothed with short semi-decumbent black hairs which appear somewhat lighter at

times. Scutellum entirely black, conical, raised to a distinct point, clothed with short erect hairs and sparsely coarsely punctured throughout. Mesopleuron deep black; sparsely coarsely punctured and clothed with short semi-decumbent hairs except the mesopleural pits at the posterior middle portion of the plate, being smooth and highly polished; pit surrounded by a few scattered punctures which merge into those more closely placed.

Metanotum entirely smooth and shiny; lateral grooves with but three distinct cross ridges. Metapleuron very sparsely coarsely punctured and clothed with short erect black hairs. Median ridge very prominent and extending to the posterior margin of the plate.

Propodeum not as strongly raised as in most species. Apical area wanting. Median, lateral and marginal areas strongly sculptured and clothed with short erect black hairs. Spiracles oval.

Abdomen.- Black with a strong bluish or violaceous lustre. Segments strongly constricted at base. Petiole bicarinate. Dorsal surface rather sparsely coarsely punctured and clothed with short semi-decumbent black hairs. Second ventral segment slightly convex along middle but not compressed. Ventral segments reddish brown white, posterior margins yellowish.

Legs sparsely coarsely punctured and clothed with short semi-decumbent hairs. Tibiae and tarsi and four anterior femora fulvous. Tibiae with a pair of long stiff spines at tips.

Wings dusky fuliginous. Accessory spur on forewings wanting.

Habitat: New Hampshire.

The above description was made from the type which was the only specimen seen. No date of capture found on labels.

This species may readily be distinguished by its deep black body, the violaceous lustre of the abdomen and the color of the legs.

Trogus fletcheri Harrington.

Trogus fletcheri Harrington, Can. Ent., XXVI, 245, 1894, ♀.

Type: ♀. Location not known to writer.

Female.- Length, 14 mm. Black with brownish abdomen and ferruginous legs. Head black; face beneath antennae, narrow orbits, palpi and mandibles ferruginous; antennae long, slender, brown above, the scape and basal half of flagellum beneath, ferruginous. Thorax black, coarsely punctured; two short lines on mesonotum; scutellum, posterior face of metathorax, tegulae and sutures at base of wings, ferruginous; legs, including coxae, entirely pale ferruginous, or rufo-testaceous; wings large, yellowish; nervures ferruginous, the costa darker. Abdomen as in exsertus, but more coarsely sculptured and of a brownish color, the first segment and base of second a little paler.

Described from one of two ♀ specimens bred by Mr. Fletcher from the pupae of a Vancouver Island papilio, and named after him in recognition of the fact that to his example and incentive

I owe my interest in entomology."

Habitat: Vancouvers Island.

I have not been able to examine specimens of this species so have reproduced the original description complete.

Trogus flavipennis Cresson.

Trogus flavipennis Cres., Proc. Ent. Soc. Phil., III, 287, 1864, ♂.

Trogus flavipennis Cres., Trans. Am. Ent. Soc., VI, 196, 1877, ♂.

Type: One male specimen from Colorado, now in the collection of the Am. Ent. Soc. at Philadelphia (type No. 1273.1).

Head.- Yellow, except black spot on frons back of antennae and spot on the lower projections of frons near the base of the clypeus: much paler about the eyes.

Clypeus quite strongly raised in middle: lower margin deeply invaginate showing the strongly exserted labrum set on the cut: lower portion with only scattered coarse punctures, more closely set above. Frontal suture prominent. Dark, round spot on vertex just back of and between hind ocelli: ridge at back of vertex black. Cheeks flat and receding: rather coarsely punctured. Mandibles strong and prominent: tips black, smooth and shiny: basal portion coarsely punctured. Head clothed with short semi-decumbent hairs. Antennae orange yellow; tips darker: strongly serrate in males.

Thorax.- Tegula, scutellum, postscutellum, wing bases and spot on pronotum yellow, remainder of thorax black. Pronotal ridge strongly visible: groove behind, smooth and shiny: large

spot of dusky orange at upper portion of pronotum: very coarsely punctured and sparsely clothed with short, semi-decumbent hairs. Neck short with yellow spot at point of articulation with head. Propleuron small; divided into two areas by a longitudinal ridge.

Mesonotum coarsely punctured and clothed with thick short silky hairs. Scutellum dusky yellow: conical and raised to a point: apex with scattered coarse punctures more closely set at base. Mesopleuron coarsely punctured, but deeply excavated, smooth and shiny near its central hind margin: thoracic lobe with narrow streak of orange on top. Epimeron strongly raised.

Postscutellum pale yellow, smooth and shiny at apex: lateral grooves deep, with parallel transverse ridges. Metapleuron with median ridge: gutter-like groove at anterior edge prominent: plate coarsely punctured.

Propodeum raised to a prominent ridge at apex from which it slopes sharply to base of petiole: median and lateral areas quite strongly sculptured: spiracles oval.

Abdomen.- Abdomen yellow except petiole and spot at base of second segment which are black: paler at tip: post-petiole bicarinate: spiracles oval: segments truncate: strogly constricted at the base: last dorsal segment but slightly exserted and broadly rounded. First ventral segment with strong median ridge: following ventral segments flat and smooth. Abdomen except petiole, clothed with short golden-yellow semi-decumbent hairs.

Wings.- Wings yellow with a golden metallic luster: trace of both accessory spurs present: veins but slightly darker than membrane. Tegula and wing bases orange-yellow.

Legs.- Coxae of fore legs black: distal segments orange-yellow. Mid legs with coxae and trochanter black. Hind legs with coxae, trochanter and femura except knees and bases of latter black. Fulvous portion of legs finely punctured and heavily clothed with fine yellowish hairs: black portions coarsely punctured and but lightly clothed with hairs. Tibial bristles wanting although the large spines are present at apex.

Habitat: Colorado.

The above description has been prepared from the type and other specimens found in the collection of the Am. Ent. Soc. at Philadelphia.

I am unable to state as to the abundance of this species but it would seem that it is quite rare. No dates of capture are given on the specimens seen.

Trogus pulcherrimus Ashmead.

Trogus pulcherrimus Ashmead, Proc. Cal. Acad. V, 1895, 547, ♂.

Type: ♂. Probably in the National Museum at Washington.

Length: 18 mm.; yellow fulvous; the upper half of the head, the antennae, upper part of pronotum. Metanotum, a spot beneath the tegulae hind legs, apical one-fourth of anterior wings and a band across before the stigma, apical two-thirds of hind wings and the three terminal segments of the abdomen black. The head is smooth, polished: mesonotum punctate, becoming very finely and closely punctate toward the lateral

margins, the pronotum punctate only along the upper hind margin: the scutellum conically elevated, sparsely punctate: metanotum with a deep transverse furrow at base, the posterior face with shallow punctures clothed with a sparse black pubescense: abdomen, except the basal half of the petiole, longitudinally shagreened.

Described from one ♂ specimen from San José del Cabo. A most lovely specimen, imitating some of the forms found in the genus Joppa.

Habitat: California.

As I have not seen any specimens of this species, I have copied Ashmead's original description complete. The description is not full enough to enable me to place the species but from the shape of the scutellum I should judge that it belongs in group I.

May prove to be T. fascipennis Cress.

Tropus fascipennis Cresson.

Tropus fascipennis Cress., Trans. Am. Ent. Soc. VI, 195, 1877, ♀.

Type: One ♀ ~~at Am. Mus. of Nat. Hist. of~~ in the Coll. of the Am. Ent. Soc. at Philadelphia (No.1272).

Small, fulvous, fifth and following abdominal segments black: head pale yellow: hind legs marked with black: four anterior legs entirely fulvous. Wings yellow with smoky tips and bands across middle.

Head.- Pale: greatly narrowed beneath. Clypeus convex, lateral edges concave: lower margin straight: lightly clothed

with semi-decumbent hairs and a few scattered punctures: clypeus shiny. Frons smooth and polished: downward projections with a few scattered coarse punctures. Vertex and cheeks strongly receding; with a few scattered punctures and short semi-decumbent hairs. Cheeks very flat. Labrum very strongly exserted: with scattered punctures and hairs: the bristle-like hairs along the lower margin much reduced. Mandibles pale, extreme tips black. Antennae black, somewhat lighter beneath except fulvous.

Thorax.- Pronotum smooth and shiny: a few scattered punctures towards the upper margin. Pronotal ridge prominent. Propleuron reduced: divided into typical areas by ridges: sparsely finely punctured and clothed with semi-decumbent yellowish hairs.

Mesonotum closely rather coarsely punctate and clothed with short semi-decumbent hairs. Scutellum rather reduced on top. Sparsely coarsely punctured and clothed with short erect hairs: small smooth and polished area near posterior margin. Mesopleuron smooth and shiny in center with a few scattered coarse punctures and short hairs about the margins.

Metanotum smooth and polished. Lateral grooves with faint transverse ridges. Metapleuron polished with a few coarse punctures and erect yellowish hairs. Median ridge wanting.

Propodeum raised to a distinct point. Apical area smooth and polished: median and lateral areas faintly rugulose: sculpturing wanting: clothed with short erect yellowish hairs. Spiracles linear.

Abdomen.- Narrow and flat: petiole not raised: segments strongly constricted at base. First four segments fulvous and aciculate, the aciculations running longitudinally: fifth and following segments black sparsely rather finely punctured. Abdomen clothed with short semi-decumbent hairs. Second ventral segment with median compression; following segments flat.

Legs fulvous except femura, outer two-thirds of tibiae and the tarsi which are black: sparsely coarsely punctured and clothed with short semi-decumbent hairs.

Wings yellow with a broad transverse band across the middle and at the tip. Accessory spur wanting.

Habitat: Texas.

The above description was made from the type at Philadelphia. No date of capture is given on the single specimen seen.

This species is easily recognized by the variegated wings and black tip of the abdomen.

Trogus edwardsii Cresson.

Trogus edwardsii Cres., Proc. Cal. Acad. Nat. Sci. p 1877 ♂.

Trogus edwardsii Cres., Trans. Am. Ent. Soc., VI, 195,1877 ♂.

Trogus edwardsii Cres., Proc. Acad.Nat. Sci., Philadelphia, 356, 1878, ♂♀

Type: One male specimen from Vancouver, now in the collection of the Am. Ent. Soc. at Philadelphia (type No. 1270)

Head.- Nearly triangular in outline, the lower portion being almost pointed. Clypeus fulvous: convex below and flat above: lower margin deeply emarginate and lateral edges somewhat

sunken: lower portion with scattered coarse punctures and but few hairs: upper portion more closely punctured and hairy. Front behind the antennae black: smooth and shiny: downward projecting fulvous: sparsely, coarsely punctured and clothed with short semi-decumbent hairs: small black spot at inner lower margin. Vertex with a broad black band extending from the anterior margin backward, surrounding the ocelli to the hind margin: vertex slightly sunken in the middle: sparsely coarsely punctured and hairy. The entire margin around the eyes fulvous with yellowish hairs. Cheeks but very slightly, if at all, swollen: black except the margin next to eyes: very sparsely punctured and clothed with short, semi-decumbent hairs. Labrum fulvous: almost smooth and shiny: row of long bristle-like hairs on lower margin. Mandibles fulvous: with black, smooth and shiny tips: sparsely coarsely punctured near base. Antennae black above and fulvous beneath: but slightly serrate in the males: oval patch-like sense organs wanting.

Thorax.- Pronotal ridge prominent: furrow behind rather deep, smooth and shiny. Hind portion of pronotum very sparsely coarsely punctured and clothed with semi-decumbent, fulvous hairs: whole plate dusky ferruginous. Propleuron black: with distinct median ridge: the lower slope clothed with long semi-decumbent black hairs and sparsely, finely punctured and the hairs much shorter.

Mesonotum ferruginous, with several broad, longitudinal, dusky bands: sparsely, rather coarsely punctured and clothed

with thick, short, semi-decumbent yellowish hairs. Scutellum raised to a distinct point but apparently more subpyramidal than conical: fulvous smooth and shiny at the tip and posterior margin: sparsely, coarsely punctured and clothed with erect orange-yellow hairs on the slopes. Mesopleuron black median band of fulvous on mesothoracic lobe: pleural pits deep, smooth and shiny: upper half of plate with scattered coarse punctures: more closely set below: hairs black, rather long and erect. Sternal plates dusky fulvous: clothed with erect yellowish hairs.

Postscutellum entirely smooth and shiny: median portion pale fulvous: lateral grooves rather dusky, with two or three parallel transverse ridges. Metapleuron black: paler posteriorly: median ridge strongly raised: very sparsely coarsely punctured and clothed with erect black hairs.

Propodeum rounded above: median and lateral areas dusky fulvous : not deeply sculptured: spiracles oval.

Abdomen.- Fulvous except black spot at base of segments 2 to 5.: petiole bicarinate, the carinae becoming obsolete before apex: area between carinae reticulate: segments truncate and strongly constricted at base: gastrocoeli present: spiracles oval to circular: dorsal surface sparsely coarsely punctured and clothed with fairly short, semi-decumbent, yellowish hairs: ventral surface flat with out a few scattered fine punctures and semi-decumbent hairs: no median ridge present on any of the ventral segments.

Wings.- Wings dark fuliginous with a strong aeneous

reflection: rather heavily covered with short brownish hairs: bases of wings fulvous.

Legs.- Four anterior legs fulvous and rather short: closely finely punctured and clothed with short yellowish hairs. Hind legs very long and slender: fulvous except coxae which are dusky black: coxa, trochanter and femur sparsely coarsely punctured: tibia and tarsus rather closely, finely punctured: tibial bristles wanting.

Habitat: Vancouver Island.

The above description has been prepared partly from the type and one other specimen from the collection of the Am. Ent. Soc. at Philadelphia, and partly from one specimen in the collection of the Ent. Lab. at the Mass. Agri. College.

This species is comparatively common in its locality. No dates of capture are given on specimens seen.

It is interesting to note the melanistic tendencies of this species. Some specimens are extremely dark and strongly marked with black, whereas others are quite light.

Trogus exesorius Brullé.

(?) Trogus vulpinus Gravenhorst, Ichneum. Europ., II, 1829, p. 389, ♀ ♂.

Trogus exesorius Brullé, Hym., 298, 1846, ♂, ♀.

Trogus (Psilomastix) vulpinus Kriech., Stettin. ent. Zeitg. XXXVI 39, 1875.

Trogus exesorius Cres., Trans. Am. Ent. Soc., VI, 19[illegible], 1877, ♂, ♀.

Trogus exesorius Provancher, Nat. Can. XI, 34, 1879, 303, 1883, ♂, ♀.

Trogus exesorius Packard, Proc. Boston Soc. Nat. Hist. XXI, 1861, 21.

Trogus exesorius Provancher, Fann. ent. Can. Hym. 303, 1883, ♀, ♂.

Trogus exesorius Mundt, Canad. Ent. XV, 89, 1883.

Trogus exsecrius Clarkson, Canad. Ent. XV, 182, 1883.

Trogus exsecrius Howard, Scudder, Butterflies U. S. p. 1878, 1889, ♀, ♂, T 88 F3.

Trogus vulvinus Birth. Ann. Soc. Ent. France LXV, 296, 1896.

Psilomastax vulvinus Kriech Ent. Nachr. XXV, 27, 1898, ♀, ♂.

Type: ♂, ♀. In the Serville collection in France.

Having taken this species as the basis for the description of the external anatomy I will merely give the distinguishing characters here.

Entirely fulvo-ferruginous, the legs somewhat paler.

Head.- Strongly narrowed beneath. Clypeus slightly convex: lateral margins sunken: lower margin broadly emarginate. Cheeks flat: antennae dusky above, paler beneath; strongly serrate in the males.

Thorax.- Pronotal ridge and furrow behind prominent. Scutellum conical, raised to a point. Median area of metanotum smooth and shiny. Median ridge of metapleuron prominent extending to posterior margin of the plate.

Abdomen.- Segments strongly constricted at the base: rather closely coarsely punctured and clothed with fairly short semi-decumbent hairs. Petiole bicarinate. Ventral segments flat.

Legs.- Somewhat paler than body. Tibiae not provided with scattered short stout spines.

Wings.- Ferruginous. Accessory spur short.

Habitat: U. S. and Can. east of Rocky Mountains.

This is the most common species of the genus and is found in the adult stage during July, August and September. The most common host is Papilio polyxenes.

Trogus atrocaeruleus Cresson.

Trogus atrocaeruleus Cres., Trans. Am. Ent. Soc. II, 92, 1868, ♀.

Trogus atrocaeruleus Cres., Trans. Am. Ent. Soc. VI, 186, 1877, ♀.

Type: ♀. Location of type not known. Allotype at Phila. To writer.

Entirely dull black.

Head.- Almost quadrangular in outline. Clypeus flat, lateral edges but very convex: lower margin straight across, possibly slightly produced at center. Upper portion coarsely punctured and clothed with thick semi-decumbent brownish hairs. Lower portion smooth and shiny. Upper portion of frons with a very small polished area about antennae pits: rest of plate closely rather finely punctured and clothed with very short semi-decumbent hairs. Vertex and cheeks closely finely punctured and clothed with short semi-decumbent hairs: lower portion of latter more sparsely punctured. Cheeks strongly swollen or buccate. Labrum hidden. Mandibles deep black, somewhat lighter and smooth at tips. Antennae dull greyish brown: bases polished and lighter colored.

Thorax.- Pronotum sparsely finely punctured above, the punctures being scattered below: pronotal ridge distinct but not prominent. Propleuron clothed with rather long black semi-decumbent hairs and sparsely finely punctured.

Mesonotum strongly raised: very closely and finely punctured and clothed with short almost decumbent hairs. Scutellum not strongly raised; rounded at top and with a lateral ridge extending along each side near the apex, starting at the anterior margin and becoming obsolete before reaching posterior margin: plate rather strongly raised, punctured and clothed with comparatively long erect black hairs. Metapleuron uniformly sparsely coarsely punctured and clothed with short semi-decumbent hairs except the smooth and polish pleural plate.

Metanotum black: median area raised, very closely and finely punctured and covered with short, erect, black hairs; lateral grooves with faint traces of transverse ridges. Metapleuron black: closely coarsely punctured and clothed with erect black hairs: median ridge entirely wanting.

Propodeum rather rounded above: apical area smooth and shiny, slightly depressed. Median lateral and marginal areas but very slightly sculptured, closely finely punctured and clothed with erect black hairs. Spiracles large and linear.

Abdomen.- Black, closely finely punctured and clothed with very short fine decurbent hairs above. Ventral surface polish and bearing a few scattered short hairs. Segments not constricted at the base: petiole faintly bicarinate, the carinae becoming obsolete before reaching apex. Second ventral segment with distinct median compression or ridge.

Legs.- Entirely black; four anterior tibiae and tarsi somewhat lighter. Legs sparsely covered with medium sized punctures and clothed with short semi-decumbent hairs. Tibiae armed with a pair of long spines at tips and with numerous scattered short, stout spurs. Single spine at tip of fore tibia modified to form part of antenna cleaner.

Wings.- Ranging from blackish fuliginous with a strong violaceous reflection to light fuliginous with an aeneous reflection.

Habitat: Montana, Kansas.

The above description was prepared from one male and one female specimen found at the Am. Mus. of Nat. Hist. of Philadelphia. The former I have marked allotype. No date of capture is given on any of the specimens seen.

Trogus Brullei Crosson.

Trogus Brullei Cres., Trans. Am. Ent. Soc., VI, 136, 1877, ♂ ♀.

Trogus Brullei Prov., Nat. Can. XI, 34, 1879, ♀.

Trogus Brullei Prov., Faun. Ent. d. Can. Hym., 500, 1883, ♀.

Type: ♂ ~~at Am. Mus. of Nat. Hist.~~ in the Coll. of the Am. Ent. Soc. at Phila. (#1267.1).

Deep black, immaculate: fore tibiae beneath and spot on each side of face inside of compound eyes dark ferruginous: antennae orange-yellow, darker at tips: band of ferruginous across apex of ventral segments three to five inclusive.

Head.- Very much the same as obsidianator. Clypeus slightly convex with a transverse groove or depression at the center: lower margin almost straight. Upper part of frons concave, smooth and shiny. Top of head or vertex slightly

sunken. Labrum moderately exerted: row of long [illegible]-like hairs on lower margin. Cheeks buccate but not quite as strongly swollen as in obsidianator. Head covered with coarse punctures and fine black hairs which are longer at base of clypeus. Mandibles large and strong: transverse band of dark [illegible] brown at center: tips smooth and shiny: sparsely coarsely punctured near base.

Thorax.- Neck rather short: ridge on propleuron wanting or at most very indistinct. Spot in center of pronotum smooth and shiny about which are scattered punctures becoming more closely placed toward the edges of the plate.

Mesonotum finely punctured and clothed with short, semi-decumbent hairs. Scutellum, [illegible] and metathorax same as in obsidianator.

Propodeum robust: not strongly raised above: median, lateral and marginal areas rather coarsely sculptured: spiracles large, linear.

Abdomen.- Black except band of ferruginous across apex of 3d, 4th, and 5th ventral segments. Postpetiole subpyramidal: raised to a point before apex: spiracles somewhat linear: ventral surface flat: dorsal surface minutely punctured and clothed with very short, decumbent, black hairs: segments normal: not constricted at base.

Wings.- Dark fuliginous: smoky: veins not much darker than membrane.

Legs.- Long and slender: heavily clothed with short black hairs: black except ferruginous on under side of fore tibiae.

Habitat: Canada, New England, New York, Pa., Georgia.

The above description was prepared partly from the type, partly from material found in the Brooklyn Museum Collection and partly from one specimen in collection at the Massachusetts Agricultural College.

This species is rather common although not so common as obsidianator which it very much resembles. It is easily distinguished from obsidianator by the shape of the postpetiole.

Trogus obsidianator Brullé.

Trogus obsidianator Brullé, hym., 299, 1846, ♀.

Trogus obsidianator Cres., Trans. Am. Ent. Soc., VI, 196, 1877, ♀ ♂.

Trogus obsidianator Howard, Scudder's Butterflies of New England, III, 1879, 1889.

Type: ♀ ~~in the collection of Mr. Serville in Philadelphia.~~ Location unknown.

Head.- Black with a lemon-yellow spot on each side of face between the clypeus and compound eyes: a dark orange spot on each cheek next to compound eyes: labrum dusky ferruginous: mandibles with fulvous band across center. Clypeus rather flat: lateral margins sunken: lower edge emarginate: lower portion with a few scattered coarse punctures and lightly clothed with short black hairs: upper half much more closely punctured and more heavily clothed: often slightly aciculate. Upper part of frons with but a very small smooth and shiny area about the bases of the antennae, the rest being closely finely punctured and clothed with fine black hairs: lower portion of frons sparsely finely punctured and

clothed with brownish hairs. Vertex rounded with very close fine punctures and short, erect brownish hairs. Cheeks strongly swollen; covered with sparse fine punctures and semi-decumbent, brownish-black hairs. Labrum moderately exserted: dusky yellow: row of long brownish bristle-like hairs on lower margin. Mandibles smooth and shiny at their tips: a broad, transverse, orange band at centre. Antennae ringed from a light lemon-yellow to deep orange: but slightly serrate in male and scarcely broadened and flattened beyond the middle in the females: male antennae with 18 patch-like sense organs.

Thorax.- Deep black, immaculate. Pronotum strongly rugose: frontal ridge prominent and its adjacent groove finely deep: pronotum clothed with short, semi-recumbent black hairs. Propleuron divided into two distinct areas by a strong ridge.

Mesonotum closely finely punctured and clothed with short, finely decumbent brownish hairs. Scutellum sub-pyramidal: entire surface coarsely finely punctured and clothed with rather long, erect, black hairs. Mesopleuron rugose over entire surface except the epimeral pit which are small, smooth and shiny.

Median area of metascutellum broad, finely punctured and clothed with fine erect black hairs: lateral grooves smooth and shiny: flap-like sense areas greatly reduced as compared with species in group one. Median ridge of metapleuron quite prominent but the margin of the plate is not reduced at its extremity as is often the case: metapleuron covered with a fine network of faint closely set ridges.

Propodeum rounded above: [illegible] area greatly reduced in size to a [illegible] point: areas strongly sculptured and clothed with [illegible] long erect black hairs: [illegible] long and linear.

Abdomen.- Postpetiole bicarinate before apex, the carinae becoming obsolete before apex: segments not constricted at the base: dorsal surface very closely finely punctured and clothed with short, decumbent, black hairs: ventral surface reddish brown, flat, smooth and shiny, bearing a few scattered short hairs.

Wings.- Dark fuliginous: veins darker.

Legs.- Black, except the knees, tibiae and tarsi of the fore legs which are fulvous: sparsely coarsely punctured and clothed with semi-decumbent hairs.

Habitat: New England, Pa., Ill., Ohio, New York, Ca., Tex., New Jersey.

The above description was prepared from material from the collections at the Am. Mus. in New York, Cornell University and the Massachusetts Agricultural College. This species is quite common appearing in the latter part of July and August. It resembles T. brunei very closely but is easily distinguished from it by the shape of the petiole.

Trogus marginipennis Cresson.

Trogus marginipennis Cresson, Trans. Am. Ent. Soc. II, 93, 1868, ♂.

Trogus marginipennis Cresson, Trans. Am. Ent. Soc. VI, 196, 1877, ♂.

Type: ♂. Collection of Am. Ent. Soc. at Philadelphia (#1276.1)

All black, immaculate: except large spot of reddish brown on second dorsal abdominal segment.

Head.- Rather quadrangular viewed from the front. Clypeus flat with slightly impressed groove [illegible]: lateral margins slightly sunken: anterior margin straight: labrum hidden. Upper portion of frons punctured and clothed with short fine hairs but slightly concave: downward projection [illegible] raised or convex in center. Vertex uniformly punctured. Cheeks strongly buccate: sparsely covered with fine punctures. Face more coarsely punctured. Antennae deep black: somewhat lighter at tips.

Thorax.- Pronotum strongly aciculate at base: central groove only moderately deep: pronotal ridge indistinct, but faintly visible. Propleural ridge strongly marked separating the plate into the two typical areas. Ventral surface of prothorax heavily clothed with long black hairs.

Mesonotum rather broadly rounded: finely punctured and clothed with short dusky yellowish hairs. Scutellum only slightly raised: rounded on top: entire surface [illegible] finely punctured and clothed with erect hairs. Hind margin of prepectus marked by a very distinct ridge, becoming obsolete as it bears the upper margin. Mesopleuron coarsely punctured except hemipleural pits which are quite small, smooth and shiny. Episternum separated from epimeron by distinct groove bearing parallel transverse ridges.

Median area of mesoscutellum sparsely coarsely punctured: lateral grooves with but faint transverse ridges: sensory organ represented only by a small tuft of hairs. Metapleuron coarsely punctured: median ridge indistinct.

Propodeum not strongly elevated: small rounded area at apex slightly concave or sunken: median and lateral areas but very slightly sculptured: spiracles long, linear:

Abdomen.- Strongly elevated : second dorsal segment with large reddish brown spot: petiole faintly bicarinate, the carinnae becoming obsolete before the apex: spiracles oval: segments not constricted at the base: dorsal surface very closely finely punctured and clothed with short decumbent hairs: ventral surface of second and third segments with strong median ridge, faintly visible on fourth segment: following segments flat.

Wings.- Yellow: fore wings with broad smoky apical margins: veins but little darker than membrane: accessory spur on vein M represented by a slight knob.

Legs.- Black: long and slender: tibiae with numerous short, scattered bristles: tarsal hairs usually dusky orange.

Habitat: N. Y., Kans., Dac.

The above description has been made partly from the type, partly from one specimen sent to me from the collection of the Am. Ent. Soc. at Philadelphia.

This species apparently has a wide range as specimens have been taken from very widely separated points. It is readily distinguished by the broad fulvous spot on the second abdominal segment, the rest of the body being deep black.

The type was captured in Dakota. No date of capture is given on the specimens seen.

Trogus austrinus Cresson.

Trogus austrinus Cresson, Trans. Am. Ent. Soc., II, 92, 1868, ♀, ♂.

Trogus austrinus Cresson, Trans. Am. Ent. Soc., VI, 197, 1877, ♀, ♂.

Type: ♂. ♀. Now in the collection of the Am. Ent. Soc. at Philadelphia (#1266.1).

Black with fulvous markings.

Head.- Entirely fulvous: Clypeus flat: lateral margins slightly sunken: anterior margin deeply emarginate at center: lower portion with a few scatteredcoarse punctures and coarse semi-decumbent, bristle-like hairs: upper portion more closely punctate and clothed with short, fine, erect hairs. Frons with a very small smooth and shiny area around the antennal pits: closely punctured above with a black spot in the center: lower projections slightly convex. Vertex sparsely, rather finely punctured and clothed with very short semi-decumbent hairs. Cheeks broad and swollen: sparsely punctured and clothed with short semi-decumbent hairs: a dark brownish spot at lower margin near the base of the mandibles. Labrum not strongly exserted but fitting with the emargination of the clypeus smooth and shiny with a row of rather long bristle-like hairs on lower margin. Mandibles broad and stout: tips black, smooth and shiny: rather coarsely punctured and clothed with fine hairs near base. Antennae orange-yellow:

not noticeably serrate in males: patch-like sense organs indistinct.

Thorax.- Upper posterior portion of pronotum ferruginous: rest of prothorax black. Pronotum closely coarsely punctured and clothed with short, semi-decumbent hairs: pronotal ridge prominent: groove behind rather deep and faintly rugulose. Propleural ridge present.

Mesonotum entirely ferruginous: two short parallel longitudinal grooves at anterior region: rather closely finely punctured and clothed with short semi-decumbent hairs. Scutellum strongly raised subpyramidal in shape: reddish brown spots near anterior and posterior margins: sparsely rather coarsely punctured and clothed with erect hairs on entire surface. Upper portion of mesopleuron sparsely coarsely punctured: lower portion rugulose: mesopleural pit small, smooth and shiny. Mesothoracic lobe with a small ferruginous spot on the center.

Median area of postscutellum reddish brown: closely finely punctured and clothed with fine, erect hairs: lateral grooves polished and slightly rugulose, the ridges running transversely. Metapleuron black: very coarsely sculptured and clothed with erect black hairs: median ridge present but not prominent.

Propodeum black rounded, strongly sculptured and clothed with erect black hairs: apical area reduced to a point: spiracles long and linear.

Abdomen.- Abdomen entirely black: post-petiole flat: segments not constricted at the base: dorsal surface closely finely punctured and clothed with very short, semi-decumbent, black hairs: ventral surface covered with close, fine, shallow punctures and scattered black hairs: ventral segments one and two with a strong median ridge: spiracles oval.

Wings.- Very dark fuliginous with an aeneous reflection: veins black.

Legs.- Sparsely coarsely punctured and clothed with short, semi-decumbent hairs. Fore-legs entirely fulvous except coxae: base of trochanters and tips of tarsi black. Mid-legs black with fulvous knees and tibiae, and brownish tarsi. Hind legs entirely black. Tibiae with numerous scattered bristle-like spines.

Habitat: Ga., Fla.

The above description was made partly from the type, partly from a single male specimen from the collection of Dr. G. C. Crampton. It is apparently entirely a southern form. No date of capture is given on any of the specimens seen.

Trogus atrox Cresson.

Trogus atrox Cresson, Trans. Am. Ent. Soc. II, 93, 1868, ♀.

Trogus atrox Cresson, Trans. Am. Ent. Soc. VI, 197, 1877.♀.

Type: One female ~~at Am. Mus. of Nat. Hist. of~~ in the collection of The Am. Ent. Soc. at Phila.(#1265).

Small, dull black with reddish brown markings: second

dorsal abdominal segment with broad, transverse orange band.

Head.- Entirely reddish brown: face broad, nearly quadrangular in outline. Clypeus flat, slightly concave at lateral edges and with a transverse shallow groove through the middle: lower margin nearly straight across: sparsely coarsely punctured and clothed with short semi-decumbent black hairs: upper portion more closely punctured. Frons with a very small polished area about antennae pits: remainder of plate closely finely punctured. Vertex sparsely finely punctured and clothed with very short semi-decumbent hairs. Cheeks strongly buccate. Labrum barely visible appearing as a mere line below the clypeus. Mandibles broad and strong lower margin tinged with black. Antennae dusky greyish, brighter at the base.

Thorax.- Pronotum closely rather finely punctured and clothed with short semi-decumbent hairs: lower portion rugulose: pronotal ridge distinct. Propleuron small, sparsely finely punctured and clothed with semi-decumbent hairs: ridge distinct.

Mesonotum rather flat above: closely finely punctured and clothed with very short, fine semi-decumbent hairs. Scutellum rounded above with faint lateral ridges. Closely punctured and clothed with erect hairs: entirely black. Mesopleuron sparsely coarsely punctured below but more closely and finely punctate above: clothed with erect black hairs: mesopleural pits small, smooth and polished.

Median area of metanotum raised, closely finely punctured and clothed with erect black hairs. Lateral grooves polished with no transverse ridges. Metapleuron reddish-black: closely coarsely punctate and clothed with erect hairs: median ridge wanting.

Propodeum rounded above: apical area concave, polished but punctate. Areas not closely sculptured but rather finely punctured and clothed with erect black hairs. Spiracles rather long and linear.

Abdomen.- Reddish black with a broad orange spot on second dorsal segment. Segments not strongly constricted at the base: closely finely punctured and clothed with very short decumbent hairs. Ventral surface smooth. Post-petiole flat but with two smooth polished longitudinal lines on dorsal surface.

Legs.- Reddish black: tibiae and tarsi lighter: closely rather finely punctured and clothed with short semi-decumbent hairs. Tibiae armed with short stout scattered spurs.

Wings.- Rather light fuliginous.

Habitat: S. Dakota.

The above description was prepared from the type at Philadelphia. No date of capture is given on the specimens seen.

This species is readily distinguished by the large orange spot on the second dorsal abdominal segment.

Trogus apicalis Cresson.

Trogus apicalis Cresson, Trans. Am. Ent. Soc. VI, 197,1877,♀.

Type: One ♀ ~~in Mus. Nat. Hist. of~~ in the collection of the Am. Ent. Soc. at Philadelphia (No. 1255).

Head.- Rather broad and almost uniformed coarsely punctured and clothed with erect to semi-decumbent hairs large lemon yellow spot on either side of face: bulb of scape of antennae yellowish: labrum yellow. Clypeus very slightly raised, lateral edges sunken: lower margin straight or but very slightly emarginate: upper portion of clypeus more closely punctured than below. Upper portion of frons sparsely coarsely punctured and clothed with very short fine hairs. Vertex and cheeks sparsely coarsely punctured, the latter slightly swollen. Labrum rather strongly and broadly exserted and closely finely punctate, the lower margin bearing a row of long stiff hairs. Mandibles of a reddish brown color but little lighter at the tips and rimmed with yellow at the base; tips smooth and shiny. Antennae of female distinctly broadened and flattened beyond the middle.

Thorax.- Pronotum black: slightly concave and smooth and shiny in middle, rest of plate sparsely coarsely punctured and clothed with short semi-decumbent hairs. Pronotal ridge quite prominent. Propleuron almost smooth and shiny below and clothed with rather long semi-decumbent hairs: propleural ridge indistinct.

Scutum black, rather closely finely punctured and clothed with short semi-decumbent hairs. Scutellum more subpyramidal

than conical in shape: dusky fulvous with black spot near anterior margin: coarsely punctured and clothed with erect hairs over entire surface. Meso-episternum black, a large smooth and shiny area in middle; rest of plate coarsely punctured and clothed with semi-discumbent hairs. Prepectus and meso-epimeron dusky fulvous. Metanotum smooth and shiny, dusky fulvous; lateral grooves with a few cross ridges. Metapleuron black with lighter hind margins: sparsely coarsely punctured and clothed with rather long erect hairs, Median ridge prominent but becoming rather indistinct before reaching hinder margin.

Propodeum black except marginal areas which are fulvous. Propodeum strongly raised, the apical area smooth and polished: median lateral and marginal areas very coarsely and deeply sculptured and clothed with rather long erect hairs. Spiracles long and oval.

Abdomen.- First and second dorsal abdominal segments black, following dusky fulvous. All ventral segment except first fulvous. Segments not strongly constricted at the base and clothed with short decumbent hairs and closely finely punctured. Second ventral segment with distinct median ridge: following segments flat: clothed with rather long semi-decumbent hairs.

Legs.- Black, four anterior tibiae and tarsi somewhat lighter: coarsely punctured and clothed with semi-decumbent hairs. Tibiae provided with a few short, stout, scattered

spines other than the pair at tips.

Wings.- Dark fuliginous with a very strong violaceous reflection. Accessory spur pronounced.

Habitat: Ga.

The above description was made from the type which is the only specimen of the species I have seen. This is apparently a very rare species. No date of capture is given on the specimen seen.

Trogus occidentalis Cresson

Trogus occidentalis Cres., Trans. Am. Ent. Soc. II, 93,1868, ♂.

Trogus occidentalis Cres., Trans. Am. Ent. Soc. VI, 197, 1877, ♂.

Type: One male ~~at the Am. Mus. of Nat. Hist. of~~ in the coll. of the Am. Ent. Soc. at Philadelphia (No. 1278).

Body light fulvous marked with black. A rather large insect.

Head.- Broad, almost quadrangular: fulvo-ferruginous, face paler with a black spot above antennal pits. Clypeus slightly convex at top: lower portion flat: lateral edges concave: lower margin produced in middle, closely coarsely punctured above and more sparsely so on lower portion of plate: clothed with short erect yellow hairs. Frons smooth and polished above antennal pits with a large black spot at that point. Vertex very closely and finely punctured behind ocelli: more sparsely and coarsely punctured to the sides. Cheeks strongly swollen sparsely coarsely punctured and clothed with short semi-decumbent hairs. Labrum moderately exserted: pale yellow: smooth and shiny: lower

margin with a row of long bristle-like hairs. Mandibles large and stout: smooth and shiny: tips black. (antennae gone).

Thorax.- Pronotum fulvo-ferruginous with a broad band of black across the lower portion: sparsely coarsely punctate and clothed with short semi-decumbent hairs. Pronotal ridge and groove indistinct. Propleuron black.

Mesonotum closely coarsely punctured and clothed with very short semi-decumbent hairs: fulvo-ferruginous with a broad median black band extending from the anterior margin to about the middle of the plate. Scutellum fulvous: quite strongly raised but rounded on top: sparsely coarsely punctured and clothed with short erect yellowish hairs. Mesopleuron sparsely coarsely punctate except the smooth and shiny pits near posterior margin: upper anterior portion fulvous, lower and posterior portion black.

Metanotum fulvous: median area sparsely finely punctured and clothed with short erect hairs: lateral grooves with numerous cross ridges. Metapleuron black: sparsely covered with coarse deep punctures and short erect black hairs. Median ridge wanting.

Propodeum quite strongly raised: anterior face black: apical area small fulvous, smooth and polished: median area fulvous with a large black spot near lateral margin: lateral areas fulvous: marginal areas fulvous except anterior portion which are black: slightly sculptured and clothed with short erect hairs: spiracles long, linear.

Abdomen.- Fourth and following segments and the base of

the third segment brownish black: rest of abdomen fulvous : dorsal segment closely finely punctured and clothed with very short fine decumbent hairs: segments not constricted at the base: petiole raised to a point before apex: ventral surface fulvous and flat: clothed with a few semi-decumbent hairs.

Legs.- Fulvous: tibiae and tarsi paler: coxae marked with brownish: legs sparsely coarsely punctured and clothed with short semi-decumbent hairs: tibiae armed with scattered short stout spurs.

Wings.- Fuliginous with a violaceous reflection: lighter at bases and a light spot at costal margin beyond stigma.

Habitat: Dakota.

The above description was made from the type at Philadelphia which is the only specimen I have seen. No date of capture is given.

This species is easily distinguished by its size and variegated coloring.

Trogus nubilipennis Haldeman.

Trogus nubilipennis Haldeman, Proc. Acad. Nat. Sc. Phila. III, 127, 1846.

Trogus nubilipennis Cresson, Trans. Am. Ent. Soc. VI, 198, 1877, ♀.

Type: The location of the type is unknown.

Head.- Entirely fulvous: uniformly punctured and clothed with short erect to semi-decumbent yellowish hairs, except a small area about the antennal pits which is smooth and shiny. Clypeus flat: lateral margins slightly sunken: lower

margin very slightly emarginate. Frons above the clypeus smooth and shiny about antennal pits, finely punctured on upper portion: frontal suture faint, almost indescernible. Vertex with a narrow band of very fine, close-set punctures extending between the eyes and around the ocelli. Cheeks very strongly swollen. Labrum but slightly exserted, only the lower margin visible: row of long hairs on margin. Mandibles fulvous: tips black, smooth and shiny. Antennae black: scape fulvous: a pale yellow annulus in the middle: tips fulvous beneath.

Thorax.- Entirely fulvous except where stated to the contrary: sparsely coarsely punctured and clothed with short semi-decumbent hairs. Pronotal ridge faint: furrow behind quite distinct. Propleural ridge present. Scutellum rounded: covered with sparse coarse punctures and short erect hairs. Mesopleuron sparsely coarsely punctured: faintly rugose on its lower half: mesopleural pits deep, smooth and shiny: hind margin of prepectus a very pronounced ridge.

Median area of postscutellum raised, sparsely finely punctured and hairy: lateral grooves smooth and shiny. Metapleuron heavily and closely rugose: median ridge prominent: furrow at anterior margin very faint, with no distinct transverse ridges.

Propodeum strongly raised to a point: apical area smooth and polished, much wider than long: lateral edges of median area parallel and straight, extending to the base of the petiole: an irregular ridge extends diagonally across

the lateral area becoming obsolete in the posterior portion of the marginal area. Propodeum rather coarsely wrinkled or sculptured and clothed with fairly long erect hairs: spiracles long and linear.

Abdomen.- Rather robust: first two segments fulvous, following segments black: segments not constricted at the base: petiole raised to a point before apex: spiracles oval: dorsal surface very closely finely punctured and clothed with short decumbent hairs: ventral surface entirely flat, with a few scattered fine punctures and semi-decumbent hairs.

Wings.- Dark fuliginous with a violaceous to aeneous reflection: veins almost black and very prominent.

Legs.- Entirely fulvous, the tibiae and tarsi much paler than other segments: sparsely finely punctured and heavily clothed with short, semi-decumbent yellowish hairs.

Habitat: Canada, New York, Pa.,Va., Ga.

The above description was prepared partly from a single specimen from the Brooklyn Museum collection and partly from specimens in the collection of the Am. Ent. Soc. at Philadelphia.

This species covers a fairly wide range of territory but is evidently quite rare. No data of capture is given on the specimens seen.

Trogus quebecensis Provancher.

Trogus Quebecensis Prov., Nat. Can., VI, 335, 1874.

Trogus Quebecensis Cres., Trans. Am. Ent. Soc., VI, 197, 1877, ♀.

Trogus Quebecensis Prov., Nat. Can., XI, 34, 1879. ♀.

Trogus Quebecensis Prov., Faun. Ent. du. Can. Hym., 303, 1883, ♀.

Type: Probably in the Provancher collection at Quebec, Canada.

Female: Length one inch. Fulvous with black marking. Head fulvous with a black spot behind the antennae. Antennae fulvous, black at tips, thickening beyond the middle and terminating in a fine point. Thorax black, finely punctured, the anterior and upper margins of the prothorax, the pleural sutures, the tegulae, a line before and another below the scutellum and postscutellum, a spot on the metathorax at the junction of the carinnae, the legs including the coxae and trochanters, and the three basal segments of the abdomen, fulvous. Dorsal surface of the mesothorax fulvous with three longitudinal, black bands, the median not extending beyond the middle. Scutellum conical, polished. Metathorax strongly rugose, concave at the base and raised at the point where the longitudinal carinae meet the transverse one, forming there a polished, yellow protuberance. Abdomen very long, slightly arched, the sides nearly parallel startin at the second segment, finely punctured, the sutures rather shallow, fourth and following segments black: the first segment raised to a smooth point a little before the posterior margin. Wings with the stigma yellowish, the nervures medium brown: areola petiolate, the tips of the four wings tinged with brown.

Habitat: Canada.

Since I have been unable to examine any specimens of this species and the original description was not available,

I have translated Provancher's description from his Hymenopteres.

Trogus bolteri Cresson.

Trogus Bolteri Cres., Trans. Am. Ent. Soc., II, 94, 1868. ♂.

Trogus Bolteri Cres., Trans. Am. Ent. Soc., VI, 197, 1877, ♂.

Type: ♂. Probably in the Bolter collection at the University of Illinois at Champaign, Ill.

Male: Long, narrow, black: head quadrate, not narrowed beneath: face, anterior orbits, a broad line on lower half of posterior orbits clypeus, mandibles and palpi, lemon-yellow; antennae rather long, subserrate, black, the scape yellow beneath: tegulae, a spot before and a short line beneath each anterior wing, scutellum and a spot on postscutellum, fulvous: scutellum obtusely elevated; metathorax rugose, much elevated on its disk, the carina across the middle sharply defined, the entral area very small and transverse: wings yellowish hyaline, slightly dusky at tips, areolet petiolated, legs yellow varied with pale fulvous, posterior coxae at base behind and their femora behind, black, extreme tips of their tibiae within and the apical joint of their tarsi dusky: abdomen long, narrow, sides parallel beyond the basal segment: first segment, except at base, the whole of the second, the third, except a basal black band, and the second to fifth ventral segments, yellowish fulvous: fourth and following segments above black: basal segment gibbous before the apex.

Length: 10 1/2 lines.

Habitat: Lake Superior (Coll. Mr. A. Bolter).

The above description is taken complete from Cresson's original description as I have been unable to examine any material of this species.

Trogus nigrocinctus. n. sp.

Type: One male specimen collected by Comstock and now located in the collection at Cornell University.

Head.- Entirely black. Clypeus flat: lateral edges but slightly sunken: lower margin straight with a small knob-like protuberance in the middle: lower half sparsely coarsely punctured: upper portion more finely and closely punctate: clothed with short, semi-decumbent, black hairs. Frons smooth and shiny and deeply concave around antennal pits: sparsely coarsely punctured above and slightly convex in the middle: downward projections flat. Vertex rather closely and coarsely punctured and clothed with short semi-decumbent hairs. Cheeks broad and buccate: rather closely, coarsely punctured and clothed with short semi-decumbent hairs. Labrum reddish brown: rather strongly exserted but quite narrow: rather closely punctured with a row of long brownish bristle-like hairs on the lower margin. Mandibles black: dusky ferruginous and smooth and shiny at the tips: coarsely punctured in the middle and finely punctured at the base. Antennae fulvous: dusky at tips: scape black with paler spot at base: middle segments slightly serrate: with 18 patch-like sense organs.

Thorax.- Entirely black. Pronotum rather sparsely coarsely punctured and clothed with short semi-decumbent, black hairs: pronotal ridge distinct, as is also the groove lying behind, which is smooth and shiny in the center. Propleuron with a prominent median ridge dividing the plate into the two typical areas.

Mesonotum broadly rounded: slightly convex at anterior center: closely finely punctured and clothed with very short, semi-decumbent hairs. Scutellum quite strongly raised and rounded: entire surface covered with sparse rather fine punctures and erect, black hairs. Mesopleuron sparsely coarsely punctured above and rugose below: mesopleural pit shallow with a prominent raised smooth and shiny area above: gutter-like groove near posterior margin distinct with prominent parallel transverse ridges.

Median area of postscutellum strongly raised, closely finely punctured and clothed with short, erect hairs: lateral grooves shiny and quite deep, with but mere traces of cross ridges. Metapleuron coarsely punctate and slightly rugose: clothed with erect black hairs: median ridge wanting.

Propodeum strongly raised anteriorly: apical area very small, smooth and shiny: lateral margins diverging to a point near the apex, then converging to the base of the petiole: median, lateral and marginal areas deeply rugose or sculptured: clothed with erect, black hairs: spiracles long and linear.

Abdomen.- Fulvous except the base of the petiole and a narrow band at the base of the three following segments, black. Petiole strongly raised to a point before apex: segments not constricted at the base: dorsal surface finely punctured and clothed with short, decumbent, yellowish hairs: ventral surface flat, closely finely punctured and clothed with a few scattered, short hairs: spiracles oval: gastrocoeli prominent on second segment.

Wings.- Dusky fuliginous with an aeneous reflection: veins almost black.

Legs.- Black: tibiae and tarsi brownish: lighter beneath especially on fore legs: very sparsely coarsely punctured and clothed with short, semi-decumbent hairs: tibiae armed with short scattered bristles.

Habitat: New York.

The above description was prepared from a single male specimen, the type.

This species is apparently very rare. The only specimen seen was captured in September, 1885, by J. H. Comstock. It is readily distinguished by the narrow, black bands at the base of the second, third and fourth dorsal abdominal segments.

Trogus copei Cresson.

Trogus Copei Cresson, Trans. Am. Ent. Soc. II, 94, 1868, ♂.

Trogus Copei Cresson, Trans. Am. Ent. Soc. VI, 198, 1877, ♂.

Trogus Copei Prov., Nat. Can. XIII, 329, 1882, ♂.

Trogus Copei Prov., Faun. Ent. du Can. Hym. 768, 1883, ♂.

Type: One male specimen from West Virginia, now in the

collection of the Am. Ent. Soc. at Philadelphia (Type No. 1269).

Deep black: large spot on each side of face varying from white to lemon yellow: tibiae and tarsi black to dusky ferruginous: abdomen except petiole fulvo-ferruginous: antennae black: wings blackish fuliginous.

Head.- Clypeus flat slightly concave diagonally across the middle: lower margin slightly produced in middle: lateral edges not sunken: lower portion with large scattered punctures becoming more closely set above: clothed with short, black hairs. Frons, above deeply excavated: smooth and shiny with scattered punctures toward upper margin: frontal suture indistinct: downward projections coarsely punctured and clothed with short semi-decumbent hairs. Vertex coarsely punctured and clothed with short, semi-decumbent black hairs. Cheeks strongly buccate. Labrum hidden. Mandibles with light spot on upper margin: smooth and shiny at tips. Antennae black: quite markedly serrate: upper scape with rather long thick hairs.

Thorax.-Pronotal ridge very prominent: neck somewhat raised above the collar and coarsely punctured and hairy: groove behind the pronotal ridge distinct but not as deep as in some other species: Mesonotum rather flat on top: clothed with short semi-decumbent hairs: rather finely punctured. Scutellum rounded on top and but slightly higher than the mesonotum: covered with coarse punctures and thick erect hairs.

Mesopleuron about the same as in other species except that the lower portion bears faint upward curving lines or ridges.

Postscutellum with exceptionally deep lateral groove terminated by a sharp ridge just above the base of the hind wing. Metapleuron rugose, groove at anterior edge small and indistinct.

Propodeum rather rounded above: deeply sculptured: small area at apex smooth and shiny: clothed with short erect hairs.

Abdomen.- Ventral segments flat: post-petiole slightly raised to a point; petiolar spiracles and those on following segments oval: dorsal surface closely finely punctured and clothed with short, decumbent golden-yellow hairs.

Wings.- Wings blackish fuliginous: but lightly clothed with hairs: accessory spur strongly developed.

Legs.- Black: tibiae and tarsi somewhat lighter: sparsely coarsely punctured and clothed with short, fine, semi-decumbent hairs: tibiae armed with numerous scattered short, bristle-like spines.

Habitat: West Virginia, New York.

The above description has been prepared partly from the type, partly from one specimen from the Cornell collection.

This species may be considered rather rare. The specimen in the Cornell collection was captured in August, 1912.

Trogus canadensis Provancher.

Trogus Copei Prov., Nat. Can. VI, 335, 1873, ♀, ♂ (nec 1868)

Trogus Canadensis Prov., Nat. Can. IX, 2, 1876.

Trogus Canadensis Cresson, Trans. Am. Ent. Soc. VI, 198, 1877, ♀, ♂.

Trogus Canadensis Prov., Nat. Can. XII, 55, 1879, ♀ ♂.

Trogus Canadensis Prov., Faun. Ent. du Can. Hym., 303, 1883, ♀ ♂.

Type: ♀ ♂. Probably in the Provancher collection at Quebec, Canada.

Head.- Rather rotund: clypeus flat: dark ferruginous, becoming dusky above: anterior margin broadly emarginate. Frons above black, smooth and polished: lower projections reddish yellow: frontal suture prominent. Vertex entirely coarsely punctured. Cheeks swollen: light spot next to eyes and at base. Labrum quite strongly exserted: row of long yellowish hairs on lower margin. Antennae dusky brown: sometimes lighter beneath: the scape with a large reddish yellow spot on front.

Thorax.- Black: neck rather small, rugose and finely punctured. Pronotal ridge weakly developed, becoming obsolete before crossing the groove which is quite deeply excavated and crossed by numerous fine ridges. Propleuron with distinct ridge running parallel to the upper margin and dividing the plate into two typical areas. Pronotal spiracles oval and fulvous.

Mesonotum rather finely punctured and clothed with short fine hairs. Scutellum rounded: light spot at posterior base: sparsely coarsely punctured and clothed with short, erect, black hairs. Mesopleuron coarsely punctured and clothed with short, black hairs: mesopleural pit small, smooth and shiny.

Median area of postscutellum fulvo-ferruginous in centre: sparsely coarsely punctured: lateral grooves black: smooth and shiny, with several faint cross ridges. Metathorax coarsely punctured and clothed with erect black hairs: median ridge present.

Propodeum quite strongly raised: apical area concave and coarsely punctured: median and lateral areas quite deeply sculptured: spiracles long and linear.

Abdomen.- Dusky ferruginous except base of petiole which is black: post-petiole slightly raised before apex: petiolar spiracles oval, those on following segments more linear: ventral segments flat: dorsal segments very finely punctured and clothed with short, decumbent, yellowish hairs: segments not constricted at base.

Wings.- Dark fuliginous with an aeneous reflection: accessory spot but slightly developed: tegula brownish black.

Legs.- Black, somewhat lighter beneath: knees tibiae and tarsi fulvo-ferruginous: sparsely coarsely punctured and clothed with short semi-decumbent hairs: tibiae with numerous scattered, short, stout bristles.

Habitat: Canada, New York.

The above description was prepared from one specimen in the Massachusetts Agricultural College collection.

This species is apparently quite rare. The only specimen seen was captured in July 1902.

This species is quite distinct from depei with which it has sometimes been confused.

Trogus annulatus n. sp.

Type.- ♀ From the collection of the Brooklyn Museum. Captured in New York.

Paratype.-♀ From the collection of the American Museum in New York. Captured in New Hampshire.

Head.- Black with white spots on either side of face, mouth parts somewhat lighter. Clypeus flat: lateral edges slightly curved: lower margin straight: lower half with scattered coarse punctures and short semi-decumbent, black hairs: upper portion more closely and finely punctured and clothed with shorter hairs. Front smooth and shiny around the antennal pits: finely punctured above and on the downward projections which are convex and hairy at their lower margins a deep pit or invagination. Vertex closely finely punctured and clothed with very short semi-decumbent black hairs: Cheeks black with light scattered hairs: broad and strongly swollen: closely finely punctured and clothed with very short hairs. Labrum moderately exposed: pale fulvous: smooth and shiny except the lower margin which bears scattered rather coarse punctures and tufts of long, yellowish bristle-like hairs. Mandibles dark reddish brown except at base, black: coarsely punctured and clothed with short light hairs except at extreme tip which is smooth and shiny; teeth rather blunt. Antennae black: with pale annulus in middle: scape with dark reddish spot near base.

Thorax.- Thorax black, with a dark reddish spot at posterior margin of the scutellum: Pronotum smooth and shiny

in center with scatter[illegible] punctures above becoming more closely placed near upper margin: lower portion of plate faintly sculptured: frontal ridge very faint, not extending to the hind margin: prepleural ridge present: lower slope very sparsely coarsely punctured and clothed with fairly long semi-decumbent, black hairs: upper slope very narrow, closely finely punctured and clothed with short hairs.

Mesonotum closely finely punctured and clothed with very short semi-decumbent hairs. Scutellum rounded: clothed with short erect hairs and closely finely punctured except top which bears but a few scattered punctures: dark reddish spot near hind margin. Lower portion of mesopleuron faintly rugose: upper portion sparsely coarsely punctured: mesopleural pits broad, shallow, smooth and shiny. Propleuron shaped in such a way as to make the prepleurae almost wholly on an anterior face.

Median area of postscutellum with scattered fine punctures and very short black hairs: lateral grooves smooth and shiny, with faint transverse ridges. Metapleuron sparsely coarsely punctured: upper portion with rugae: basal ridge prominent.

Propodeum black: rather strongly sculptured or rugose: apical area flat, smooth and shiny: lateral margins of median area straight and parallel, extending to the base of the petiole: a pronounced ridge extending diagonally across the lateral and marginal areas to the lower margin of the latter: spiracles long and linear.

Abdomen.- Fulvous except base of petiole which is black: petiole very slightly raised in center before apex: segments

Rather robust, not [illegible] at the base: dorsal surface very finely punctured and clothed with short [illegible] hairs: ventral surface flat, very [illegible] finely punctate appearing almost smooth, and [illegible] with short semi-[illegible] hairs.

Wings.- Dark fuliginous with a slight violaceous reflection: veins almost black.

Legs.- Black: [illegible] four anterior tibiae [illegible] ferruginous, somewhat lighter beneath: rather closely finely punctured and clothed with short semi-[illegible] hairs: tibiae provided with [illegible] scattered short, fine, stiff bristles.

Habitat: New Hampshire, New York.

The above description was prepared from the type and a paratype from the Am. Mus. [illegible].

This species is apparently quite rare. No [illegible] of capture is given on the specimens seen.

In the paratype the thorax is entirely black: the dark reddish [illegible] of the [illegible] in the [illegible] being absent. The [illegible] segments of the abdomen are also [illegible] only at the [illegible].

Trogus fuscicornis n. sp.

Type: ♂ In the collection of the [illegible]. Ent. [illegible].

Head.- Entirely black: [illegible]. Clypeus

flat, with slightly concave lateral edges: anterior margin straight or but very slightly emarginate: upper portion very closely finely punctured: lower portion with scattered coarse punctures: heavily clothed with short, semi-decumbent black hairs. Entire frons sparsely rather coarsely punctured and clothed with short black hairs except a very small, smooth and shiny area around the antennal pits: downward projections very slightly convex in a line extending down nearly to the base of the mandibles. Vertex rather rounded on top: coarsely punctured and clothed with short semi-decumbent hairs: a narrow strip of very close fine punctures extending from the comp und eyes to the lateral ocelli with a few scattered coarse punctures appearing in this band. Cheeks very strongly swollen: closely covered with rather coarse punctures and clothed with short semi-decumbent black hairs. Labrum slightly exserted: broadly rounded on its lower margin which bears a row of long, bristle-like black hairs extending down over the mouth parts. Mandibles large and stout: smooth and shiny at the tips, sparsely coarsely punctate in the middle and more closely punctured near the base. Antennae dusky brown: scapes black: segments rather strongly serrate: nineteen prominent, polished, oval, paten-like sense organs on the middle segments: filament made up of fifty-one segments.

Thorax.- Entirely deep black. Pronotal ridge indistinct: lower portion of pronotum closely aciculate, more faintly so above: upper portion sparsely and coarsely punctate and

clothed with short, black hairs: central area concave, smooth and polished. No pronounced ridge on the propleuron but the two typical areas are quite marked.

Mesonotum quite closely and finely punctured and clothed with short semi-decumbent hairs. Scutellum rounded above: sparsely covered with coarse punctures and short, erect, black hairs. Mesopleuron sparsely coarsely punctured except the small smooth and shiny pits near the posterior margin: lower half rugose: less noticeably so above: the groove separating the episternum and epimeron with several distinct cross ridges: plate clothed with erect black hairs.

Median area of the postscutellum strongly raised, quite finely punctured: lateral grooves smooth and shiny, with but faint traces of transverse ridges. Metapleuron sparsely coarsely punctured and rugose : clothed with short, erect, black hairs.

Propodeum with a small, raised polished area at its summit: margins of the median area parallel for a short distance, then diverging to the outer edges of the base of the petiole: posterior corners of the median area cut off by very faint vertical ridges: areas sparsely coarsely punctate and clothed with erect black hairs: faintly rugose: spiracles linear.

Abdomen.- Dusky ferruginous except the base of the petiole which is black: segments not constricted at the base, normally exserted: dorsal surface very closely finely punctate and clothed with short, decumbent, yellowish hairs: ventral

surface flat, with a few scattered fine punctures and hairs: post-petiole raised to a distinct point before apex: spiracles oval.

Wings.- Very dark fuliginous with a deep violaceous to aeneous reflection: veins almost black: accessory spur quite well developed.

Legs.- Black: except tibiae which are dusky ferruginous lighter beneath; tarsi brownish: sparsely coarsely punctured and clothed with short semi-decumbent hairs: tibiae armed with scattered short, stout bristles.

Habitat: Massachusetts.

The above description was made from one male specimen collected by Mr. H. E. Smith.

This species is evidently quite rare.

Trogus cressoni n. sp.

Type: ♀. From the collection of the Am. Mus. at New York.

Paratype: One female from the same collection.

Head.- Entirely dull black. Clypeus almost flat: lateral edges slightly sunken: lower margin straight: anterior portion sparsely coarsely punctured and clothed with semi-decumbent black hairs: upper portion more closely and finely punctured and clothed with much shorter hairs. Frons with but a very small smooth and shiny area above the antennal pits: area above this closely finely punctured except a small group of coarse punctures just anterior to the median ocellus: downward projections quite strongly convex. Vertex rather closely and finely punctured: with a narrow band of extremely close

tiny punctures extending between the lateral ocelli and the compound eyes. Cheeks strongly buccate: rather closely finely punctured and clothed with short, semi-decumbent, black hairs. Labrum quite strongly exserted: smooth and shiny except lower margin which bears scattered punctures and a row of long dusky ferruginous hairs. Mandibles black. Antennae orange-yellow except tips and scapes which are black: segments beyond middle broadened and flattened in the female.

Thorax.- Entirely dull black. Pronotum sparsely coarsely punctured above: lower portion rugulose: pronotal ridge faint as is the groove behind it. Pronotal ridge present.

Mesonotum closely finely punctured and clothed with short semi-decumbent hairs: anterior portion with two distinct parallel, longitudinal impressed lines, one on each side of the median line. Scutellum not strongly elevated: sparsely coarsely punctured and clothed with erect black hairs on entire surface: sometimes a faint dark brownish spot near posterior margin: parascutellum prominent. Upper anterior portion of mesopleuron rather closely finely punctured: lower portion rugulose: mesopleural pit shallow, with a very small polished area about it.

Median area of postscutellum raised, sparsely finely punctured and clothed with short, erect yellowish hairs: lateral grooves polished, with numerous faint transverse ridges. Metapleuron coarsely punctured and faintly rugulose: clothed with erect black hairs: median ridge wanting.

Propodeum rather rounded: apical area small, slightly concave and sparsely finely punctured: median, lateral and marginal areas strongly rugose and clothed with erect black hairs: spiracles long and linear.

Abdomen.- Dark ferruginous except base of petiole which is black: petiole slightly raised to a point before apex: segments not strongly constricted at the base: dorsal surface finely punctured and clothed with short, decumbent yellowish hairs: ventral surface flat, covered with minute shallow punctures and scattered semi-decumbent hairs: spiracles linear: gastrocoeli very prominent on second segment.

Wings.- Ducky fuliginous with a faint violaceous reflection: veins black.

Legs.- Black: tibiae and tarsi somewhat lighter, the fore tibiae being almost wholly fulvous: sparsely coarsely punctured and clothed with short, semi-decumbent hairs: tibiae with numerous scattered short bristles.

Habitat: New York.

The above description was prepared from two specimens bred from Sphingidae by John Akhurst, Brooklyn, New York, in August 1899.

This species greatly resembles Trogus annulatus but may be readily distinguished from it by the orange-yellow ante-alae.

Trogus rileyi Cresson.

Trogus Rileyi Cres., Trans. Am. Ent. Soc., II, 95, 1868, ♀.

Trogus Rileyi Cres., Trans. Am. Ent. Soc. VI, 198, 1877, ♀.

Type: Location of type not known to writer, (Allotype at Phila.).

Large, fulvo-ferruginous insect: face tibiae and tarsi paler: meso and meta thoracic grooves black. Antennae black, lighter beneath and at base.

Head.- Broad face quadrangular in outline: pale fulvous except vertex and upper portion of cheeks which are fulvo-ferruginous. Clypeus flat lateral margins but slightly sunken: lower margin slightly produced in middle: closely coarsely punctured above, more sparsely so below: clothed with short semi-decumbent hairs. Upper frons smooth and shiny above antennal pits, from an suture present. Vertex and cheeks sparsely covered with medium sized punctures and short semi-decumbent hairs. Cheeks strongly swollen. Labrum quite strongly exserted: pale yellow, smooth and shiny. Mandibles large, stout, polished: black at tips. Antennae black above, lighter beneath: scapes fulvo-ferruginous: twenty-six distinct oval sense organs present.

Thorax.- Pronotum closely coarsely punctured above; more sparsely punctured below: clothed with short semi-decumbent yellowish hairs. Pronotal ridge distinct. Propleural ridge distinct lower portion of plate sparsely coarsely punctured and clothed with moderately long semi-decumbent hairs.

Mesonotum closely finely punctured and clothed with short, silky, semi-decumbent hairs. Scutellum strongly raised but rounded above: sparsely coarsely punctured and clothed with short erect yellowish hairs. Mesopleuron sparsely coarsely punctate and clothed with short semi-decumbent hairs: lower portion faintly rugulose. Gutter-like

groove between episternum and epimeron black and bearing numerous transverse ridges.

Metanotum fulvous: median area sparsely finely punctured and clothed with short erect hairs: lateral grooves with several cross ridges. Metapleuron closely coarsely punctured: lower portion slightly aciculate: clothed with short erect hairs. Median ridge split posteriorly.

Propodeum strongly raised: closely sculptured and clothed with erect yellowish hairs: apical area concave. Spiracles long linear.

Abdomen.- Post-petiole raised to a point before apex: segments not constricted at the base: very closely finely punctured and clothed with short decumbent hairs. Ventral surface flat, with a few scattered semi-recurbent hairs.

Legs.- Fulvo-ferruginous; tibiae and tarsi paler: sparsely coarsely punctured and clothed with short semi-decumbent hairs. Tibiae and first segments of tarsi provided with numerous scattered short stout spur-like spines.

Wings.- Dark fuscous, with a faint violaceous reflection and a small paler spot at stigma. Accessory spur well developed of the type found in group two.

Habitat: South Dakota and New York.

This species was described from one specimen in the collection ~~of the Am. Ent. Soc. of Am. Mus. of Nat. Hist. of~~ Philadelphia which I have called the Allotype. Mr. Cresson's original type was not available.

This species seems to have quite a wide range of habitation,

having been captured in Dakota and New York. No date of capture is given on any of the specimens seen.

Trogus buccatus Cresson.

Trogus buccatus Cres., Proc. Cal. Acad. Nat. Sci. 1877.

Trogus buccatus Cres., Trans. Am. Ent. Soc. VI, 199,1877, ♀.

Trogus buccatus Cres., Proc. Acad. Nat. Sci. Phila., 356, 1878, ♀.

Type: ♀. Collection of the Am. Ent. Soc. at Philadelphia (#136d.1).

Small, robust, entirely fulvo-ferruginous: antennae black except at base; fulvous: wings fuscous with an aeneous reflection.

Head.- Rather rounded, slightly flattened on top. Clypeus flat: lateral edges sunken: lower margin straight. Upper part of frons only slightly excavated; with scattered punctures. Vertex broadly rounded at top. Cheeks strongly swollen, rather broad and full. Labrum strongly exserted: lower margin broadly rounded. Head covered with scattered punctures and short semi-decumbent hairs. Antennae black except at base and occasionally the under part of the middle segments, fulvous: segments beyond middle strongly broadened and flattened in females.

Thorax.- Pronotal ridge indistinct, almost invisible, making the division between neck and collar but slightly marked by a series of parallel acicul ations: posterior

position of pronotum as described for obsidianator. Ridge on propleuron present. Prothorax coarsely punctured and clothed with short yellowish semi-decumbent hairs.

Mesonotum more or less broadly convex and nearly on a level with the top of the scutellum which is rounded and marked by two faint ridges; converging posteriorly to the hind slope: scutellum sparsely punctured and clothed with short erect hairs. Prepectus strongly marked off from the rest of the mesopleuron: small mesopleural pits with scattered coarse punctures: rest of plate more closely punctured and clothed with short hairs.

Median area of postscutellum sparsely coarsely punctured: lateral grooves smooth and shiny, with several transverse ridges. Metapleuron small: very coarsely rugose: clothed with short semi-decumbent yellowish hairs: median ridge wanting.

Propodeum rounded on top: apical area small, slightly concave and sparsely punctured. Median and lateral areas coarsely punctured and clothed with short, erect hairs: spiracles broadly linear.

Abdomen.- Petiole flat above or but slightly raised in a median ridge: spiracles oval: segments rather robust: ventral surface flat, with a few scattered punctures: dorsal surface very finely punctured and clothed with short, decumbent, yellowish hairs: segments not constricted at the base.

Wings.- Rather narrow: fuscous with an aeneous reflection: accessory spur represented merely by a very short stub. Costa

not fused with vein Sc + R + M but showing a narrow stripe of membrane between: vein but slightly darker than membrane.

Legs.- Long but fairly robust: sparsely coarsely punctured and clothed with short semi-decumbent yellowish hairs: tibiae with scattered short, stout bristles.

Habitat: Vancouver Island, California.

The above description has been prepared for the most part from the type but one specimen from the Am. Mus. in New York has also been used.

This species is apparently quite rare. No date of capture is given on the specimens seen.

Trogus mellosus Cresson.

Trogus mellosus Cres. Rep. geogr. and geol. Explor. Surv. V, 709, 1875, ♂.

Trogus mellosus Cres. Trans. A. Ent. Soc., VI, 193, 1877, ♀.

Holotype: ♂. Location unknown.
Allotype: ♀. Collection of the Am. Ent. Soc. in Philadelphia.

Large, entirely fulvous: face much paler: tips of antennae and mandibles black.

Head.- Clypeus flat: lateral margins but slightly sunken: lower margin straight: lower portion very coarsely punctured: upper portion more closely and finely punctured: clothed with short, semi-decumbent yellow hairs. Frons closely rather finely punctured except a very small smooth and polished area above antennal pits: lower projections sparsely coarsely punctured. Vertex sparsely punctured and clothed with short semi-decumbent hairs. Cheeks broad and strongly swollen: pale along the edge next to the compound eye: rather closely coarsely punctate and clothed with short semi-decumbent hairs.

Labrum moderately exserted: lower margin with a row of long bristle-like hairs and a few scattered coarse punctures: mandibles large and stout: tips black, smooth and shiny: sparsely punctured in the middle, more closely so at the base. Antennae fulvous: black at tips: slightly broadened and flattened beyond the middle.

Thorax.- Entirely fulvous. Pronotum sparsely coarsely punctured: the central portion roughened: frontal ridge faint. Propleural ridge distinct. Mesonotum closely finely punctured and clothed with short, semi-decumbent hairs. Scutellum broadly rounded: sparsely coarsely punctured and clothed with short, erect hairs: hind margin finely punctate. Mesopleuron sparsely coarsely punctured: slightly reticulate below: mesopleural pit shallow, smooth and polished: mesothoracic lobe pale, fulvous: epimeron pale yellow.

Median area of postscutellum closely finely punctured: lateral grooves deep and polished with several distinct transverse ridges. Metapleuron closely and coarsely punctured and clothed with short erect hairs: median ridge vanishing: groove at anterior margin black and polished.

Propodeum rounded: apical area convex, smooth and shiny: median lateral and marginal areas rugose and clothed with erect yellow hairs: spiracles long and linear.

Abdomen.- Entirely fulvous: petiole raised to a point before apex: segments not constricted at the base: second

surface very closely finely punctate and clothed with short decumbent yellow hairs: ventral surface first, covered with minute shallow punctures and scattered semi-decumbent hairs: spiracles fuscous: gastrocoeli prominent on second segment.

Wings.- Yellow, apical half fuliginous with a violaceous reflection: veins dark brown.

Legs.- Fulvous: tibiae and tarsi paler, especially on the hind legs: sparsely coarsely punctured and clothed with short semi-decumbent golden-yellow hairs: tibiae with numerous short scattered spines.

Habitat: New Mexico, Colorado.

The above description was prepared partly from the allo type, partly from a single female specimen from the collection at Cornell University. One of the specimens seen was taken August 18, 1900.

This species is very large and is easily distinguished from the others.

Trogus elegans Cresson.

Trogus elegans Cresson, Trans. Am. Ent. Soc. II, 94,1868, ♀.

Trogus elegans Cresson, Trans. Am. Ent. Soc. VI, 199, 1877, ♀.

Type: ♀. Collection of Am. Ent. Soc. at Philadelphia (#1271)=

Entirely honey yellow: face and legs, except coxae, much paler: entire body and legs covered with short yellowish hairs: antennae yellow: tips of mandibles black: wings yellowish with large irregular dusky cloud at tip of fore wing and triangular mark at tip of externo-medial cell: hind wings not marked.

Head.- Quadrangular in outline, much broader above than below. Clypeus slightly raised: lateral edges sunken: lower margin slightly emarginate: lower outside angles pale lemon-yellow. Frons above the clypeus, deeply sunken, smooth and shiny, with scattered punctures above: downward projections pale yellow. Cheeks slightly swollen: small pale spot at lower edge of eye. Labrum strongly exserted: lower margin broadly rounded: row of long, bristle-like hairs on lower edge. Head sparsely covered with rather coarse punctures. One specimen with red markings on frons, clypeus and labrum.

Thorax.- Neck rather small and narrow: pronotal ridge short and indistinct, apparently not extending to the hind margin of the pronotum: groove replaced by a narrow rugose area, not noticeably concave. Propleural ridge present.

Scutellum strongly raised, subpyramidal but slightly rounded on top: sparsely punctured and clothed with short, erect hairs throughout. Mesopleuron with deep irregular pits: slightly swollen above. Sparsely coarsely punctured below.

Postscutellum with scattered coarse punctures on median area: lateral groves smooth and shiny no apparent ridges present. Metapleuron with deep groove at interior margin which is sometimes black: median ridge present: coarsely punctured and clothed with short semi-decumbent hairs.

Propodeum with small, smooth circular area at apex: median and lateral areas strongly sculptured and clothed with short hairs.

Abdomen.- Post-petiole first above with no distinct markings spiracles small: segments but slightly compressed dorso-ventrally: dorsal surface shiny: finely punctured and clothed with very short decumbent yellow hairs: ventral surface with a few scattered fine punctures and short hairs.

Wings.- Yellow: fore wings with a broad transverse smoky band at tip and a rather large cloud in center which is broken near the costa by a narrow pale streak.

Legs.- Very long and slender: pale yellow: sparsely coarsely punctured and clothed with short semi-decumbent yellow hairs. Tibiae armed with short scattered bristles.

Habitat: Me., N. Y., Mass.

The type is very badly mutilated and only a small part of the above description could be made from it. In addition material from the Am. Mus. in New York and from Cornell University has been used.

This species is fairly abundant in July and August and may be easily determined by its light fulvous color and spotted wings.

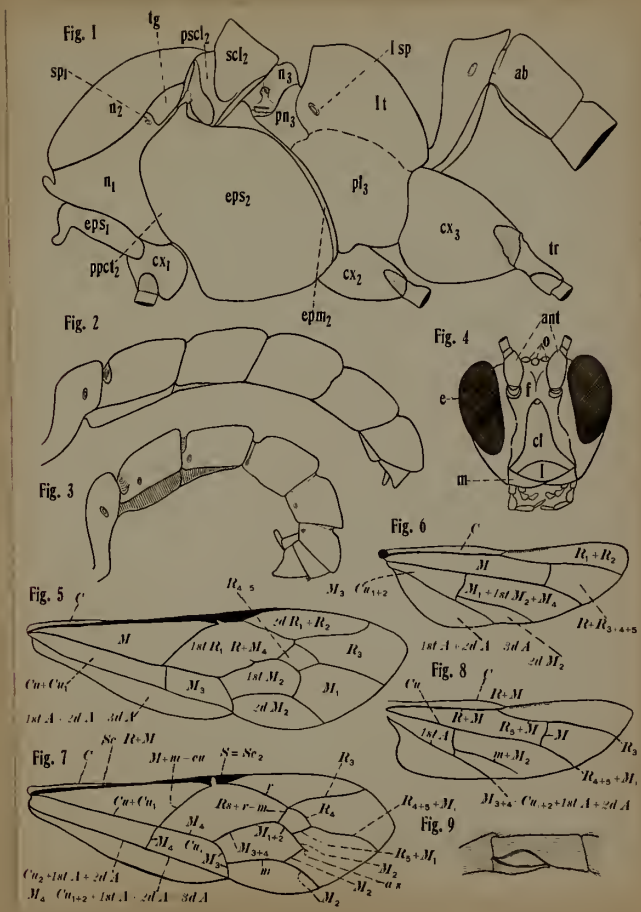
Fig. 1
tg
pscl2
scl2
sp1
n2
n3
pn3
l sp
lt
ab
n1
eps2
pl3
eps1
cx3
tr
ppct2
cx1
cx2
epm2
Fig. 2
Fig. 3
Fig. 4
ant
o
e
f
cl
l
m
Fig. 5
C
R4+5
M3
2d R1+R2
M
1st R1
R+M4
R3
Cu+Cu1
M3
1st M2
M1
2d M2
1st A+2d A+3d A
Fig. 6
C
R1+R2
M
M1+1st M2+M4
Cu1+2
R+R3+4+5
1st A+2d A+3d A
2d M2
Fig. 7
C
Sc
R+M
M+m-cu
S=Sc2
R3
r
Cu+Cu1
Rs+r-m
R4
R4+5+M1
M4
M1+2
M4
Cu1
M3+4
R5+M1
M3
m
M2
Cu2+1st A+2d A
M2
M4
Cu1+2+1st A+2d A+3d A
M2
Fig. 8
C
Cu
R+M
R+M
R5+M
M
1st A
m+M2
R3
R4+5+M1
M3+4
Cu1+2+1st A+2d A
Fig. 9

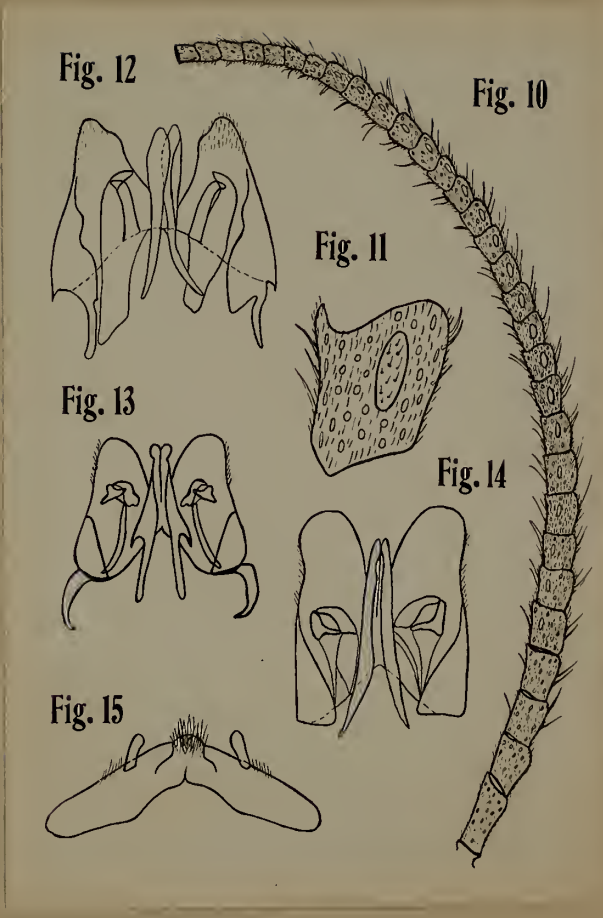
Fig. 12
Fig. 10
Fig. 11
Fig. 13
Fig. 14
Fig. 15

EXPLANATION OF PLATES.

In figures 5 and 6 I have given the nomenclature for the cells and in figures 7 and 8 the veination of the wings, the Comstock-Needham system of nomenclature being used.

Fig. 1 = thorax of T. exesorius.

Fig. 2 = abdomen of T. obsidianator.

Fig. 3 = abdomen of T. exesorius.

Fig. 4 = head of T. exesorius.

Fig. 5 = fore wing of T. obsidianator.

Fig. 6 = hind wing of T. obsidianator.

Fig. 7 = fore wing of T. exesorius.

Fig. 8 = hind wing of T. exesorius.

Fig. 9 = antenna cleaner.

Fig 10 = antenna of T. obsidianator ♂.

Fig.11 = segment of antenna showing oval sensory organ.

Fig 12 = ♂ genitalia of T. exesorius.

Fig 13 = ♂ genitalia of T. canadensis.

Fig 14 = ♂ genitalia of T. obsidianator.

Fig 15 = showing genital plate of ♀ T. exesorius.

Abbreviations.

ab. = abdomen.	$epis._2$ = mesoepisternum.
ant.= antenna	Isp. = propodial spiracle.
cl. = clypeus	Pt = propodium.
cx_1 = fore coxa.	l. = labrum.
cx_2 = mid coxa.	m = mandible.
cx_3 = hind coxa.	n_1 = pronotum.
e. = compound eye.	n_2 = Mesonotum.

epm_2 = mesepimeron.

eps_1 = prosternum.

pl_3 = metapleuron.

$pscl_2$ = parascutellum.

scl_2 = scutellum.

tg. = tegula.

n_3 = metanotum.

o = ocelli.

pn_3 = post metanotum or postnotum.

$ppct_2$ = Prepectus.

sp_1 = prothoracic spiracle.